



Scientific, Technical and Economic Committee for Fisheries (STECF)

REVIEW OF SCIENTIFIC ADVICE FOR 2010

Consolidated Advice on Stocks of Interest to the European Community

Edited by
John Casey, Willy Vanhee & Hendrik Dörner

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European Commission
Joint Research Centre
Institute for the Protection and Security of the Citizen

Contact information

Address: TP 051, 21027 Ispra (VA), Italy
E-mail: stecf-secretariat@jrc.ec.europa.eu
Tel.: 0039 0332 789343
Fax: 0039 0332 789658

<https://stecf.jrc.ec.europa.eu/home>
<http://ipsc.jrc.ec.europa.eu/>
<http://www.jrc.ec.europa.eu/>

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SCIENTIFIC, TECHNICAL AND ECONOMIC COMMITTEE FOR FISHERIES (STECF)

Consolidated Review of scientific advice for 2010 on stocks of Community interest

This report represents a consolidated version of three reports from STECF-SGECA/RST Stock Review meetings convened in 2009, SGECA/RST-09-01, SGECA/RST 09-02 and SGECA/RST 09-03. The reports from the three meetings were published as Parts 1 and 2 of the STECF review of advice for 2010, and as the review of advice for stocks in the Baltic. However, since the publication of the three separate reports, some fisheries advisory bodies have published additional information and advice and this has been taken into account in the present report. This report therefore supersedes any advice on stocks of Community interest previously given by the STECF for 2010.

General request to STECF

STECF is requested to review the most recent advice on stocks of interest to the European Community and provide any appropriate comments and recommendations. STECF is requested, in particular, to highlight any inconsistencies in assessments and advice, taking into account any additional information available. STECF is also requested to take account of data and information in the reports of any relevant assessment WGs.

In undertaking its review and providing advice, STECF is additionally requested to take into account the Harvest Control Rules adopted in recovery plans, management plans and long-term plans or Harvest Control Rules suggested in the Communication from the Commission (COM (2009) 224) on a Consultation on fishing opportunities for 2010.

Introduction to the Consolidated STECF Review of Advice for 2010

Background

This report represents the STECF review of advice for stocks of interest to the European Community in all of the world's oceans.

In undertaking the review, STECF has consulted the most recent reports on stock assessments and advice from appropriate scientific advisory bodies or other readily available literature, and has attempted to summarise it in a common format. For some stocks the review remains unchanged from the Review of advice for 2009 (STECF, 2009, EUR 23630 EN), since no new information on the status of or advice for such stocks was available at the time the present review took place.

STECF notes that the term 'stock' in some cases, may not reflect a likely biological unit, but rather a convenient management unit. In specific cases STECF has drawn attention to this fact. STECF also is of the opinion that, as far as possible, management areas should coincide with stock assessment areas.

For the first time STECF was requested by the Commission to estimate the the TACs corresponding to the decision rules contained in the Commission's Communication on Fishing Opportunities for 2010 (COM (2009) 224).

For each stock, a summary of the following information is provided:

STOCK: [Species name, scientific name], [management area]

FISHERIES: fleets prosecuting the stock, management body in charge, economic importance in relation to other fisheries, historical development of the fishery, potential of the stock in relation to reference points or historical catches, current catch (EU fleets' total), any other pertinent information.

SOURCE OF MANAGEMENT ADVICE: reference to the management advisory body.

MANAGEMENT AGREEMENT: where these exist.

PRECAUTIONARY REFERENCE POINTS: where these have been proposed.

STOCK STATUS: Reference points, current stock status in relation to these. STECF has included precautionary reference point wherever these are available.

RECENT MANAGEMENT ADVICE: summary of advice.

STECF COMMENTS: Any comments STECF thinks worthy of mention, including errors, omissions or disagreement with assessments or advice.

FISHING OPPORTUNITIES FOR 2010 according to COM (2009) 224: The TACs corresponding the to TAC decision rules contained in COM (2009) 224.

Application of the rules for calculating TACs according to the Commission's Communication on Fishing opportunities for 2010 (COM (2009) 224)

STECF has adopted the following procedure in providing options for fishing opportunities for 2010 according to COM (2009) 224.

Options when a management plan is in place or proposed.

1. If the management plan has been evaluated and has been deemed to be consistent with the precautionary approach, STECF has advised on the level of TAC corresponding to the relevant harvest control rule contained in the plan.
2. If the management plan has not yet been evaluated or the evaluation was inconclusive with respect to the precautionary approach, STECF has noted the level of TAC corresponding to the relevant harvest control rule contained in the plan.
3. If the management plan has been evaluated and has been deemed not to be consistent with the precautionary approach, STECF has noted the level of TAC corresponding to the relevant harvest control rule contained in the plan. In this case, STECF also provides options for TACs according to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010.

Options when there is no management plan in place or proposed.

4. In such circumstances STECF provides options for TACs according to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010

While recognising that some stocks are shared resources and the EU may only obtain a share of the overall TAC, the values for 2010 TACs provided in the report according to COM (2009) 224 apply to the overall TAC and not the any anticipated EU share. This is because STECF has no advance information on what share is likely to be negotiated. Note also that the TAC values provided by STECF in accordance with COM (2009) 224 should not be considered as STECF-advice, unless it is explicitly stated as such in the report sections.

The Consolidated STECF review of scientific advice for 2010 was compiled from the reports of the STECF-SGECA/RST 09-01, 09-02 and 09-03 Working Groups held in Copenhagen, Denmark; Brest, France and Vigo, Spain.

STECF acknowledges the extensive contribution made by the following participants in preparing each of those reports:

Participants SG-ECA/RST 09-01 meeting in Carlottenlund, Denmark 9-10 June 2009:

STECF members

Kirkegaard, Eskild (Chair)

External experts

Leskelä, Ari

Kornilovs, Georgs

Horbowy, Jan

JRC experts

Raid, Tiit

STECF Secretariat

Raid, Tiit

Participants SGRST 09-02 meeting in Brest, France, 29 June – 30 July 2008:

STECF members

Casey, John (Chair)
Stransky, Christoph
Vanhee, Willy

Invited experts:

Bertignac, Michel
Daskalov, Georgi
Holmes, Steven
Keatinge, Michael
Maximov, Valodia
Munch-Petersen, Sten

O’Hea, Brendan
Panayotova, Marina
Radu, Gheorge
Raykov, Violin
Shlyakhov, Vladyslav
Zengin, Mustafa

JRC expert

Raid, Tiit

STECF Secretariat

Raid, Tiit

Participants SG-ECA/RST 09-03 meeting in Vigo, Spain, 19 – 23 October 2009:

STECF members

Casey, John (Chair)
Di Natale, Antonio
Vanhee, Willy
Parkes, Graham – CCAMLR stocks by
correspondence

Invited experts:

Fabi, Gianna
Gil de Sola, Luis
Johnston, Graham
Katsanevakis, Stelios
Keatinge, Michael
Kupschus, Sven
Mahé, Jean-Claude

Main, Charlotte
Petrakis, Georges
Portella, Julio

Experts contributing by correspondence:

Abellán, Luis López – Southwest Atlantic stocks
Arkhipkin, Alexander- Southwest Atlantic stocks
Santamaría, Teresa García – CECAF stocks
García-Isarch, E. - CECAF stocks
Fernández, L - CECAF stocks

JRC expert

Druon, Jean-Noël

STECF Secretariat

Druon, Jean-Noël

CONSOLIDATED STECF REVIEW OF SCIENTIFIC ADVICE FOR 2010

This report does not necessarily reflect the view of the European Commission and in no way anticipates the Commission's future policy in this area

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1. Resources in the Baltic Sea

1.1. Brill (*Scophthalmus rhombus*) in the Baltic Sea (Subdivisions 22-32)

FISHERIES: The brill fishery is carried out mainly by Denmark in Subdivision 22. Total reported landings have fluctuated between 1 and 160 t. It can be assumed that the total landings of brill reported for 1994-1996 are over-reported due to species-misreporting in the landings of the directed cod fishery.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: There are no precautionary reference points proposed for brill in the Baltic.

STOCK STATUS: The stock status is unknown. The only information available for this stock is landing statistics.

MANAGEMENT OBJECTIVES

No management objectives have been defined for this stock.

RECENT MANAGEMENT ADVICE: The available data are insufficient for assessing the current stock size and exploitation, and ICES gives no management advice on the brill stocks in the Baltic.

STECF COMMENTS: STECF has no comments.

1.2. Cod (*Gadus morhua*) in the Baltic Sea (Subdivisions 22-24)

FISHERIES: Cod in Subdivisions 22-24 is exploited predominantly by Denmark and Germany, with smaller catches taken by Sweden and Poland. The fishery is conducted by trawl and gillnets. Landings fluctuated between 40,000 and 54,000 t from 1965 to 1985, falling in the late 1980s reaching a record low value in 1991. Landings increased again until 1995 where they reached 51,000 t. After 1995 landings have declined again and have in recent years been between 20,000 and 24,000 t.

The fishery has in former years largely been based on recruiting year-classes and 4 years and older fish constituted less than 15 % of the landings in numbers. In 2007 and 2008 the proportion of older age groups has increased and app. 40 % of the number of fish landed were 4 years or older. ICES has estimated discards in 2008 to 5 % of the total catch in weight and 14 % when measured in numbers. The majority of the discards are undersized cod and there is no indication of high grading.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial as well as survey data. A new assessment model (SAM) was used in this year's assessment. The model provides statistically sound estimates of uncertainties in the results.

REFERENCE POINTS: The proposed precautionary reference point for spawning biomass is $B_{pa} = 23,000$ t. The basis for B_{pa} is MBAL (minimum biological acceptable level of SSB). ICES consider that B_{lim} , F_{pa} and F_{lim} are not yet defined.

MANAGEMENT AGREEMENT: The EC has agreed on a management plan for cod in the Baltic Sea in September 2007. For Western Baltic cod the aim is to reach a fishing mortality rate at levels no lower than 0.6. This should be reached by fixing the TAC consistent with an annual reduction in F by 10% and by annually reducing the total number of days a vessel can fish in the area by 10 % until the target F of 0.6 has been reached. The plan sets a maximum change of 15% of the TAC between consecutive years, unless the fishing mortality is estimated to be higher than 1.

In addition to the rules for setting the TAC and fishing effort the plan includes a number of control provisions and only two types of trawls (BACOMA with 110 mm square mesh panel and T90) are allowed in the cod trawl fishery.

ICES evaluated the plan in 2009 and considers it is in accordance with the precautionary approach.

STOCK STATUS:

Spawning biomass in relation to precautionary limits	Fishing mortality in relation to precautionary limits	Fishing mortality in relation to high long term yield	Fishing mortality in relation to agreed target reference points	Comment
Increased risk	Undefined	Over-exploited	Above target	EU Management plan implemented in 2008 with target fishing mortality of 0.6

Based on the most recent estimates of SSB, ICES classifies the stock as being at risk of reduced reproductive capacity, with the spawning stock being below B_{pa} in 2009. F in 2008 was estimated to be 0.83 and has decreased by 30 % since 2000. F is, however, still well above the target F of 0.6. The year classes 2004 – 2007 are among the weakest in the time series. Although the 2008 year class is estimated to be the highest since 2003, it is still below average.

RECENT MANAGEMENT ADVICE:

Exploitation boundaries in relation to existing management plan: Following the agreed and evaluated EU management plan a reduction of 10% of the 2009 F of 0.82 results in an F in 2010 of 0.74, which implies landings of 17700 t in 2010. This result in an increase of landings by 8.6% compared to the TAC in 2009. This is expected to lead to an increase of 15 % in SSB from 2010 to 2011 (20100 t.).

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: ICES has previously recommended target fishing mortalities of 0.3 - 0.6 which would result in a low risk to reproduction and high long-term yields. This would correspond to landings of 8,600-15,000 t in 2010.

Exploitation boundaries in relation to precautionary limits: Landings below 13300 t in 2010 would be expected to increase SSB to above B_{pa} in 2011.

Conclusions on exploitation boundaries: ICES advises on the basis of the management plan that TAC should be increased by 8.6 % to 17,700 t in 2010.

STECF COMMENTS: STECF agrees with the advice from ICES and notes that in accordance with the multi-annual management plan landings in 2010 should be 17,700 t. This figure is calculated on the basis of a 10 % reduction in F .

STECF notes that ICES has evaluated the multi-annual management plan and considers it in accordance with the precautionary approach.

1.3. Cod (*Gadus morhua*) in the Baltic Sea (Subdivisions 25-32)

FISHERIES: Cod in Subdivisions 25-32 is exploited predominantly by Poland, Sweden, and Denmark, the remaining catches taken by Latvia, Lithuania, Russia, Germany, Finland, and Estonia. Cod is taken primarily by trawlers and gillnetters. The use of gillnets started in the 1990s and peaked shortly thereafter; at present this fishing method contributes about 30% to the total catch.

The reported landings for the years 1992–1995 are known to be incorrect due to incomplete reporting and these landings have therefore been estimated. Unreported and misreported catches from 1993 - 1996 were between about 7% and 38% of reported landings.

Estimates are available for misreporting since 2000 from a range of industry and enforcement sources. These indicate that catches in 2000 to 2007 have been around 32 - 45% higher than the reported figures. In 2008 unreported landings are estimated to 7 % of reported landings. Landings have fluctuated between 42,000 t and 392,000 t (1965 - 2008). In 2008 the landings including unreported landings amounted to 42,000 t.

Discards are estimated to be 8 % in weight and 18 % in numbers in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

REFERENCE POINTS: The precautionary reference points for fishing mortality proposed by ICES are $F_{pa} = 0.6$ and $F_{lim} = 0.96$. Integrated ecosystem assessment carried out by ICES has demonstrated a major shift in food web composition and ICES considers that the precautionary biomass reference points ($B_{pa} = 240,000$ t and $B_{lim} = 160,000$ t) so far recommended for the Eastern Baltic cod stock are not considered applicable any more. No new biomass reference points have been proposed by ICES. The fishing mortality reference points were not rejected as they have been shown to be much less affected by the observed regime shift.

MANAGEMENT AGREEMENT: The EC has agreed on a management plan for cod in the Baltic Sea in September 2007. For Eastern Baltic cod the aim is to reach a fishing mortality rate no lower than 0.3. This should be reached by fixing the TAC consistent with an annual reduction in F by 10% and by annually reducing the total number of days a vessel can fish in the area by 10 % until the target F of 0.3 has been reached. The plan sets a maximum change of 15% of the TAC between consecutive years, unless the fishing mortality is estimated to be higher than 1.

In addition to the rules for setting the TAC and fishing effort the plan includes a number of control provisions and only two types of trawls (BACOMA with 110 mm square mesh panel and T90) are allowed in the cod trawl fishery.

For 2009 the TAC was increased by 15% following almost 40% increase in stock size in 2008 comparing to 2007.

STOCK STATUS:

Spawning biomass in relation to precautionary limits	Fishing mortality in relation to precautionary limits	Fishing mortality in relation to high long term yield	Fishing mortality in relation to agreed target reference points	Comment
Undefined	Harvested sustainable	Appropriate	Below target	EU Management plan implemented in 2008 with target fishing mortality of 0.3

In the absence of applicable biomass reference points, the state of the stock cannot be evaluated with regards to these. SSB (2009) is estimated to be around 15% below the long-term average (1966–2008). Marked increase in spawning-stock biomass has been observed since 2007. Based on the most recent estimates of fishing mortality (for 2008) ICES classifies the stock as being harvested sustainable and below the agreed target. The 2003, 2005, and 2006 year classes are above the average of the past 15 years.

RECENT MANAGEMENT ADVICE: For this advice, ICES defines “ F ” as the total fishing mortality including discards and unallocated landings, and “landings” to comprise all landings, whether they are legal or illegal, but excluding predicted discards.

The catch options provided by ICES for 2010 is assuming status quo fishing mortality in 2009. This gives estimated landings of 61,700 t and discards of 3,300 t. The TAC for 2009 is 49,380 t (Community quota of 44,580 t plus Russian quota of 4,800 t). ICES therefore in the catch forecast assumes unreported landings of 12,300 t corresponding to 25% of the TAC. Unreported landings in 2008 estimated to 7% of the reported landings.

Exploitation boundaries in relation to existing management plans: The estimated F in 2008 is 0.24, which is below the target fishing mortality of 0.3 in the EU management plan. Under status quo F of 0.24 the landings in 2010 would be 80,700 t. (and 2,300 t of discards) and biomass in 2011 would increase to almost 380,000 tons.

The management plan limits the deviation of the TACs between consecutive years to a 15% increase of the total TAC, which would result in a TAC of 56,800 t for 2010. Landings of 56,800 t in 2010 are expected to be associated with discards of 1,600 t. This catch corresponds to $F = 0.16$ for 2010.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: ICES has previously recommended a target fishing mortality of 0.3, which would result in a low risk to reproduction and high long-term yields. Such a fishing mortality corresponds to landings of 98,000 t.

Exploitation boundaries in relation to precautionary limits: Fishing at F_{pa} in 2010 corresponds to landings of 181,000 t.

Conclusion on exploitation boundaries: The management plan has been evaluated by ICES as consistent with precautionary approach. ICES therefore advises on the basis of management plan. This approach corresponds to a TAC of 56,800 t in 2010.

STECF COMMENTS: STECF agrees with ICES advice.

STECF notes that ICES has evaluated that the multi-annual management plan adopted in 2007 is in accordance with the precautionary approach. Target fishing mortalities (including all catches) close to 0.3 (ages 4-7) would result in a low risk to reproduction and high long-term yields. The management plan is only in accordance with the precautionary approach if effectively implemented and enforced. The situation in former years with significant amounts of non-reported cod landings indicates that overall, enforcement was not effective. However, the enforcement improved markedly in 2008, resulting in decrease of underreported catches from previously estimated at over 30% of reported values to 7%.

STECF notes that the TAC advice provided by ICES for 2010 is assuming status quo fishing mortality in 2009. This gives estimated landings of 61,700 t and discards of 3,300 t in 2009. The TAC for 2009 is 49,380 t (Community quota of 44,580 t plus Russian quota of 4,800 t). ICES therefore in the catch forecast implicit assumes unreported landings of 12,300 t in 2009 corresponding to 25% of the TAC.

There is no indication of major change in the level of unreporting from 2008 to 2009 and STECF considers that the forecast provided by ICES for 2009 overestimates the likely catches. STECF considers that it is more likely that the level of unreporting in 2009 will be the same as in 2008. This corresponds to total landings in 2009 of 52,800 t (TAC of 49,300 t plus 7% unreported) and discards of 2,800 t.

STECF has recalculated the catch forecast for 2010 on the basis of: Landings (2009) = 52,8kt; discards (2009) = 2,8kt; $F(2009) = 0.20$; $SSB(2010) = 334.1\text{kt}$. The table below gives three options for 2010: A: total landings in 2010 equal to the TAC for 2009 plus 15% (management plan); B: a status quo fishing mortality in 2010 ($F(2010) = F(2009)$); C: $F(2010) = 0.3$.

Option	Landings (2010) in kt	Basis	Total F (2010)	F landings (2010)	F discards (2010)	Discards (2010) in kt	Total catch (2010) in kt	SSB (2011) in kt	% SSB change	% TAC change
A	56.8	15 % TAC deviation	0.16	0.16	0.002	1.6	58.4	417	25%	15%
B	61	$F(2010) = F(2009)$	0.20	0.20	0.002	2.0	63.0	403	21%	24%
C	98	$F(2010) = 0.3$	0.3	0.3	0.003	2.9	100.5	369	10%	98%

STECF notes that the TAC of 56,800 t for 2010 set in accordance with the multi-annual management plan will, because of the constraint on annual variation in TAC, result in a fishing mortality of 0.16 which is well below the target F of 0.3 and is equivalent to a reduction in F of 20% compared to 2009.

STECF notes that the objective of the multi-annual management plan to reduce the fishing mortality to level associated with high long-term yield (F close to 0.3) has been fulfilled and fishing mortality is estimated to be well below the target. STECF notes that a TAC of 98,000 t for 2010 based on a target fishing mortality of 0.3 is consistent with the objective of the multi-annual management plan.

According to article 8(5) of the multi-annual management plan (Council Regulation (EC) No 1098/2007) the fishing effort in 2010 shall be equal to the fishing effort in 2009 multiplied by the target fishing mortality and divided by the fishing mortality in 2009 ($\text{Effort}(2010) = \text{Effort}(2009) \times 0.3 / F(2009)$). With $F(2009)$ equal to 0.2 the effort in 2010 should be increased by 50% compared to 2009. Assuming a 1:1 ratio between fishing effort and fishing mortality and no catch restrictions an effort increase of 50% would result in a fishing mortality of 0.3 in 2010.

This illustrates that there is a discrepancy between the allowed fishing effort and the effort required to take the TAC resulting from the management plan. To ensure consistency between the fishing effort and the TAC the fishing effort should be regulated so that it matches the fishing mortality associated with the agreed TAC. This means that if the TAC for 2010 is fixed at 56,800 t the fishing effort should be reduced by 20% which is equal to the required reduction in fishing mortality.

To ensure that the discrepancy between fishing effort and fishing mortality does not result in increased discarding or unreported landings, it is important that the fisheries catching cod in 2010 be regulated in such a way that all catches of cod do not exceed the TAC plus expected discards.

STECF underlines that the above considerations regarding fishing effort and fishing mortality are based on the assumption of a 1 to 1 ratio between fishing effort and fishing mortality. STECF does not have information available to quantify the relationship between fishing effort and fishing mortality. However, the CPUE data for Danish trawlers used by ICES in the assessment indicates that this is not the case and that the necessary reduction in fishing effort would be lower than the reduction in fishing mortality.

1.4. Dab (*Limanda limanda*) in the Baltic Sea (Subdivisions 22-32)

FISHERIES: The total landings of dab have declined from 1,894 t in 2004 to 697 t in 2008. During the years 1994 to 1996 the total landings of dab were over-reported due to by-catch misreporting in cod fishery. The highest landings are observed in Subdivision 22. The main dab landings are reported by Denmark (Subdivisions 22 and 24) and Germany (mainly in Subdivision 22).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: There are no precautionary reference points proposed for dab in the Baltic.

STOCK STATUS: The stock status is unknown. The only information available for this stock is landing statistics.

MANAGEMENT OBJECTIVES: No management objectives have been defined for this stock.

RECENT MANAGEMENT ADVICE: The available data are insufficient for assessing the current stock size and exploitation, and ICES gives no management advice on the dab stock in the Baltic.

STECF COMMENTS: STECF has no comments.

1.5. Flounder (*Platichthys flesus*) – IIbcd (EU zone), Baltic Sea

FISHERIES: All countries surrounding the Baltic Sea report landings of flounder. It is mainly taken as by-catch in fisheries for cod, but there are also fisheries targeting this species. Since 1973 total recorded landings have fluctuated between 10-20 thousand t. During the mid-1990s flounder landings were misreported (over-reported) from the cod trawl fishery, mainly for Subdivisions 24 and 25. In 2008 the reported landings reached record high level of 23,889 t, of which 18,000 t is reported for subdivisions 24 and 25.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No assessment of the state of the stock is presented by ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for the flounder stocks in the Baltic.

STOCK STATUS: Baltic flounder is composed of several sub-stocks but the information is insufficient to define stock boundaries in the area. The most recent ICES advice states that the size of most of the stocks is

unknown. An exploratory analytical assessment was undertaken in 2005 for the flounder stock in Subdivisions 24 and 25. The results indicated a stable spawning stock in the entire period of the assessment (since 1978). There were indications of above average recruitment in recent years, fishing mortality has increased slightly over this period, and landings have increased since the late 90s. However, the assessment was rejected by ICES and remained exploratory.

RECENT MANAGEMENT ADVICE: There are no explicit management objectives for this stock. Data are insufficient for management advice and no advice is available from ICES.

STECF COMMENTS: STECF considers it unlikely that the assessment of the flounder stocks is improved significantly unless the Baltic fisheries research institutes give higher priority to flounder work and international cooperation on enhancing the quality of basic data is established.

1.6. Herring (*Clupea harengus*) in Divisions IIIbcd, Baltic Sea

The present ICES stock assessment units of Baltic herring and the existing management units are shown in the text table below:

Herring Stock Unit	Existing Management Area
Herring in IIIa and Sub-divisions 22-24	Sub-divisions 22 – 24
	IIIa
Sub-divisions 25 to 29 and 32	Sub-divisions 25,26,27,29, 32 and 28.2 (excl. Gulf of Riga)
Gulf of Riga Herring (sub-division 28)	Sub-division 28.1 (Gulf of Riga)
Herring in Sub- division 30	Sub-divisions 30-31
Herring in Sub-division 31	Sub-divisions 30-31

1.6.1. Herring (*Clupea harengus*) in Subdivisions 25-29 (excluding Gulf of Riga) and 32.

FISHERIES: All the countries surrounding the Baltic, exploit the herring in these areas as part of fishery mixed with sprat. Over the last 30 years, landings of herring have decreased from a peak of 369,000 t in 1974 to 91,300 t in 2005. Since then landings have gradually increased to 126,155 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on catch data and on an international acoustic survey. Natural mortality is derived from a multispecies model from 2006 rescaled to the most recent estimates of cod biomass. Recruitment estimates for forecasts are based on the acoustic survey. Catches of central Baltic spring-spawning herring taken in the Gulf of Riga are included in the assessment.

REFERENCE POINTS: The proposed precautionary reference point for fishing mortality is $F_{pa} = 0.19$. ICES indicates that F_{pa} needs revision but does not propose a revised value. There is no biological basis at present for determining biomass reference points. A candidate for reference point which is consistent with a high long term yields and low risk of depleting the productive potential of the stock is $F_y=0.22$.

STOCK STATUS:

Spawning biomass in relation to precautionary limits	Fishing mortality in relation to precautionary limits	Fishing mortality in relation to high long term yield	Fishing mortality in relation to agreed target reference points	Comment
Undefined	Increased risk	Overexploited	N/A	

In the absence of defined biomass reference points the state of the stock cannot be evaluated with regard to these. The SSB has decreased steadily between the mid-1970s and the beginning of the century and increased since, but was rather stable in the last three years. The SSB estimate for 2009 is 557,000 t., 39 % below the long-term average. Based on the most recent estimates of fishing mortality, the stock is classified at risk to be harvested unsustainably. F has been slightly above F_{pa} in recent years and is now at the level of $F=0.25$.

RECENT MANAGEMENT ADVICE:

Exploitation boundaries in relation to high long term yield, low risk of depletion of production potential and considering ecosystem effects:

The current fishing mortality, estimated at 0.25, is above the candidate $F_y=0.22$.

Exploitation boundaries in relation to precautionary limits: The fishing mortality in 2010 should be below $F_{pa} = 0.19$, corresponding to landings of less than 103,000 t.

STECF COMMENTS: STECF agrees with the ICES advice. STECF, however, notes that the basis for ICES advice is the F_{pa} , which ICES has indicated needs to be revised. STECF furthermore notes that the advice provided by ICES is referring to the stock and not to management area. Therefore in the herring TAC for the Sub-divisions 25-27, 28.2, 29&32 the average catches of this stock in Sub-division 28.1 should be excluded and the average catches of Gulf of Riga herring taken outside the Gulf of Riga in Sd 28.2 should be included. This would correspond to a TAC of 100,000 t in 2010 (Table 1).

STECF notes that using the TAC rules proposed by the Commission (COM(2009) 224) would result in a TAC for 2010 of 122,060 t (category 2 stock, 15 % reduction in TAC).

1.6.2. Herring (*Clupea harengus*) in the Gulf of Riga.

FISHERIES: Herring catches in the Gulf of Riga include both Gulf herring and open-sea herring, which enter the Gulf of Riga from April to June for spawning. In the past 25 years landings have fluctuated between 15,000 and 40,000 t. The herring in the Gulf of Riga is fished by Estonia and Latvia. The structure of the fishery has remained unchanged in recent decades. Approximately 70% of the catches are taken by the trawl fishery and 30% by a trap net fishery on the spawning grounds. Landings in 2008 were 37,100 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: The proposed precautionary reference point for F (F_{pa}) is set at 0.40; F_{lim} is not defined. An integrated ecosystem assessment shows a major shift in food web composition and in environmental drivers, and therefore the biomass reference points used in previous assessments were not considered applicable anymore. Candidates for reference points which are consistent with a high long-term yields and low risk of depleting the productive potential of the stock are in the range of $F_{0.1}-F=0.35$.

STOCK STATUS:

Spawning biomass in relation to precautionary limits	Fishing mortality in relation to precautionary limits	Fishing mortality in relation to high long term yield	Fishing mortality in relation to agreed target reference points	Comment
Undefined	Harvested sustainably	Overexploited	N/A	

In the absence of applicable biomass reference points, the state of the stock cannot be evaluated with regard to these. Following high recruitment, SSB increased in the late-1980s and has been around 18% above the long-term average. Based on the most recent estimates of fishing mortality, ICES classifies the stock as being harvested sustainably. The fishing mortality has been below F_{pa} in the last year. The year classes of 2005, 2007 and 2008 are strong, while the year class of 2006 is poor.

RECENT MANAGEMENT ADVICE:

Exploitation boundaries in relation to high long term yield, low risk of depletion of production potential and considering ecosystem effects:

The current fishing mortality, estimated at 0.38, is above the candidate F which will lead to high long-term yields and low risk of depletion.

Exploitation boundaries in relation to precautionary limits

The fishing mortality in 2010 should be below F_{pa} ($= 0.4$), corresponding to landings of less than 33,400 t.

STECF COMMENTS: STECF agrees with the ICES advice. STECF, however, notes that this advice is referring to the stock and not to management area. Therefore in the TAC for the Gulf of Riga (Sd 28.1) average catches of open sea herring should be included and the average catches of Gulf of Riga herring taken outside the Gulf of Riga should be excluded. The ICES advice therefore corresponds to a TAC of 36,400 t in 2010 (Table 1).

Table 1. Setting of herring TACs by management area in Sub-divisions 25-27, 28.2, 29&32 and in Sub-division 28.1.

Stock	Stock advice	Average 5 year catch taken outside management area	Average 5 year catch of another stock taken in the management area	Management area advice
Sd 25-27, 28.2, 29&32	103,000	3,300	300	100,000
Sd 28.1	33,400	300	3,300	36,400

1.6.3. Herring (*Clupea harengus*) in Subdivision 30, Bothnian Sea

FISHERIES: Finland and Sweden carry out herring fishery in this area, mainly with pelagic trawls. On average 90% of the total catch is taken by trawl fishery. The trap-net fishery is of minor importance. In the trawl fishery more effective and larger trawls have been introduced in the 1990s. Landings were relative stable around 20 to 30,000 t until 1992, after which they increased to between 50 and 60,000 t. A further increase in landings has taken place in 2006 and 2007 and reached a record high level of 75,400 t in 2007. In 2008 the landings were 65,400 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: An integrated ecosystem assessment shows a major shift in food web composition and in environmental drivers, and therefore the biomass reference points used in previous assessments were not considered applicable anymore. The proposed precautionary reference point for F (F_{pa}) is set at 0.21 while F_{lim} is considered to be 0.3. Candidates for reference points which are consistent with a high long-term yields and low risk of depleting the productive potential of the stock are in the range of $F_{0.1}$ to F_{pa} .

STOCK STATUS:

Spawning biomass in relation to precautionary limits	Fishing mortality in relation to precautionary limits	Fishing mortality in relation to high long term yield	Fishing mortality in relation to agreed target reference points	Comment
Undefined	Harvested sustainably	Appropriate	NA	

In the absence of applicable biomass reference points, the state of the stock cannot be evaluated with regard to these. Following high recruitment, SSB tripled in biomass in the late-1980s and has remained high since. Based

on the most recent estimates of fishing mortality, ICES classifies the stock as being harvested sustainably. The fishing mortality has been below F_{pa} since the beginning of time series, fluctuating between 0.1 and 0.2.

RECENT MANAGEMENT ADVICE: The fishing mortality in 2010 should be below F_{pa} (= 0.21), corresponding to landings of less than 109,600 t.

STECF COMMENTS: STECF agrees with the ICES advice.

The TAC covers Subdivisions 30 and 31 and should be set in accordance with the advice given for the herring stocks in 30 and in 31. STECF advises that the catch in Subdivision 31 should be below the level observed in most recent years (see section ...). This gives a combined TAC advice for Subdivision 30 and 31 of 112,000 t for 2010.

Using the TAC rules proposed by the Commission (COM(2009) 224) for setting TAC for stock exploited at the maximum sustainable yield rate the TAC should not be increased by more than 25% that would correspond to catches of 103,400 t in 2010.

1.6.4. Herring (*Clupea harengus*) in Sub-div. 31, Bothnian Bay (Management Unit 3)

FISHERIES: Trawl fisheries account for the main part of the total catches. Normally the trawl fishing season begins in late April and ends before the spawning season in late May to July. It resumes in August/September and continues, until the ice cover appears, usually in early November. The catch in 2008 was about 2,500 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: Precautionary Approach reference points are not defined.

STOCK STATUS: The available information is inadequate to evaluate stock trends. Therefore the state of the stock is unknown and there is no basis for an advice.

RECENT MANAGEMENT ADVICE: The only new information that is available for herring in Subdivision 31 is landings data. The advice for 2010 is not provided by ICES.

STECF COMMENTS: STECF notes that recent average catches 2002-2008 have been below the long-term mean and in 2008 decreased to 2,500 t. In recent years the fishery has been largely supported by the 2002 year-class. Given that these observations indicate that the stock may be reduced compared to its long-term status, and that the exploitation rate is unknown, STECF advises that the catch should be kept below the level observed in most recent years.

1.7. Plaice (*Pleuronectes platessa*) in the Baltic Sea (Subdivisions 22-32)

FISHERIES: The highest total landings of plaice were observed at the end of the seventies (8,289 t in 1979) and the lowest in 1989 (403 t). Since 1995 the landings increased again and reached a moderate temporal maximum in 2002 (2,763 t). After then the landings decreased to 1,350 t in 2008. The fluctuations are supposed to be caused mainly by immigration of plaice from the Kattegat into the western Baltic Sea. ICES Subdivision 22 is the main fishing area, and Denmark is the main fishing country. Subdivision 25 is on the second place. Poland and Denmark are the main fishing countries there.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: There are no precautionary reference points proposed for plaice in the Baltic.

STOCK STATUS: The stock status is unknown. The only information available for this stock is landing statistics.

MANAGEMENT OBJECTIVES: No management objectives have been defined for this stock.

RECENT MANAGEMENT ADVICE: The available data are insufficient for assessing the current stock size and exploitation, and ICES gives no management advice on the Plaice stocks in the Baltic.

STECF COMMENTS: The available information is insufficient for STECF to provide a management advice for the plaice in the Baltic Sea.

1.8. Salmon (*Salmo salar*) in the Baltic Sea, Div. IIb,c,d (Main Basin and Gulf of Bothnia, Sub-div. 22-31)

FISHERIES: The total catch in the Baltic Sea (including rivers) has declined over 80 % since 1990, from 5636 (1990) to 1011 t (2008). The decline has been largest in the offshore fishery where landings in 2008 were 200 t or only 5 % of landings reported in 1990. Landings from coastal fisheries have declined by almost 70 % to 440 t in 2008, while river catches have shown no clear trend with reported landings in 2008 of 260 t. 35% of the EC quota for 2008 was landed.

Non-reported catches and discards are estimated to be about 27% of the total catches in 2008.

The decreased catches are largely explained by quota and national restrictions, reduced post smolt survival and declining effort mainly in the offshore fishery caused by a drift net ban since Jan 2008 but also by poor market prices and market restrictions related to high dioxin contents. The nominal catch in the offshore fishery decreased by 63% from 2007 to 2008.

There has been an increase in the proportion of wild salmon in catches, relative to reared salmon, which reflects the increased wild smolt production. The share of non-commercial (recreational) catches has increased and will likely increase further.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: To evaluate the state of the stock ICES uses the smolt production relative to the 50% and 75% level of the natural production capacity on a river-by-river basis. Potential smolt production capacity estimates for the individual rivers were updated in this year's assessment.

MANAGEMENT AGREEMENTS: In 1997 IBSFC adopted the Salmon Action Plan (SAP) running 1997–2010 where the long-term objectives are:

1. To prevent the extinction of wild populations, further decrease of naturally produced smolts should not be allowed.
2. The production of wild salmon should gradually increase to attain by 2010 for each salmon river a natural production of wild Baltic salmon of at least 50% of the best estimate potential and within safe genetic limits, in order to achieve a better balance between wild and reared salmon.
3. Wild salmon populations shall be re-established in potential salmon rivers.
4. The level of fishing should be maintained as high as possible. Only restrictions necessary to achieve the first three objectives should be implemented.
5. Reared smolts and earlier salmon life stage releases shall be closely monitored.

No update of objectives has been set by the EU Commission replacing the IBSFC Salmon Action Plan (SAP).

STOCK STATUS: In order to better support the management of wild salmon stocks, ICES has established five assessment units for the Baltic Main Basin and the Gulf of Bothnia.

Assessment unit	Name	Salmon rivers included
1	Northeastern Bothnian Bay stocks	On the Finnish-Swedish coast from Perhonjoki northward to the river Råneälven, including River Tornionjoki
2	Western Bothnian Bay stocks	On the Swedish coast between Lögdeälven and Luleälven
3	Bothnian Sea stocks	On the Swedish coast from Dalälven northward to Gideälven and on the Finnish coast from Paimionjoki northwards to Kyrönjoki
4	Western Main Basin stocks	Rivers on the Swedish coast in Divisions 25–29
5	Eastern Main Basin stocks	Estonian, Latvian, Lithuanian, and Polish rivers

The overall estimated smolt production has been increasing and will continue to stay high in the near future. The total wild smolt production has increased about tenfold in assessment units 1–2 since the Salmon Action Plan was adopted in 1997. Wild smolt production is now estimated to be 70-75 % of the potential total smolt production. However smolt production is still low in rivers where salmon were extirpated and are now being reintroduced.

Due to the ban on the driftnet fishery as of January 2008, the salmon catches in 2008 were lower than in 2007. This resulted in an increased number of spawners during the 2008. The post-smolt survival was low in 2004-2006, but increased again in 2007, which is predicted to further aid the recovery of spawning populations in the short term

From the 27 rivers assessed by ICES, 18 are likely or very likely to reach the 50% target in 2010. Five rivers are unlikely to reach that target. The target is more likely to be met in productive rivers especially in the Northern Baltic Sea area while the status of less productive wild stocks in other areas remains poor.

RECENT MANAGEMENT ADVICE: In order to ensure recovery of the salmon stocks ICES recommends for 2010 a TAC of not more than 133 000 salmon. This reflects the predicted catch of these fisheries in the low exploitation scenario, which is very similar to a *status quo* (2008) effort.

Salmon management should be based on the assessments of the status of individual stocks in the rivers. Fisheries on mixed stocks, either in coastal waters or open sea areas, pose particular difficulties for management. These fisheries cannot target only those stocks that are close to or above their targets when they exploit stocks which are above and below reference points. Fisheries in estuaries and rivers are more likely to fulfil this requirement.

The rivers Emån, Pärnu, Nemunas basin, Rickleån, Öreälven are especially weak and they need longer-term stock rebuilding measures, including fisheries restrictions, habitat restoration and removal of physical barriers. In order to maximise the potential recovery of these stocks from these measures, it is recommended that further decreases in exploitation are required along their spawning migration routes. A high degree of mixing is likely as salmon of the rivers Rickleån and Öreälven pass the Åland Sea and Bothnian Sea on their spawning migration. Salmon spawners of the river Pärnu pass the coastal waters of the Gulf of Riga. Salmon of the river Emån pass the coastal waters around the Öland Island, and salmon of the Nemunas basin pass the coastal waters around the Curonian lagoon on their spawning migration.

STECF COMMENTS: ICES recommends that the TAC for 2010 should be set to no more than 133 000 salmon. With a TAC of 133 000 salmon, predicted total catch (reported and unreported commercial catch + recreational catch), would be 200 000 salmon. STECF notes that under this low effort scenario smolt production is predicted to continue the increasing trend in most of the rivers.

The overall estimated smolt production has been increasing and will continue to stay high in the near future and the number of spawners are estimated to increase slightly in the short term. However, the status of the less productive wild stocks is poor and it is uncertain if they will reach the 50 % of the potential smolt production level.

STECF notes that applying the TAC rules proposed by the Commission (COM(2009) 224) would result in a TAC for 2010 of 263 500 specimens. (*category 6, 15 % decrease*)

STECF underlines the need to establish new operational aims for the Baltic salmon stocks for the future management. STECF notes that since the dissolution of the IBSFC the salmon action plan has not been replaced and there is currently no formal management plan for salmon in this area.

1.9. Salmon (*Salmo salar*) in the Baltic Sea, Gulf of Finland (Sub-div. 32)

FISHERIES: The salmon fishery in the Gulf of Finland is mainly based on reared fish. Estonia, Finland and Russia are participating in the salmon fishery. Salmon catches in the area are low, and although commercial effort is low there is substantial (but poorly quantified) effort and catches by recreational fishers. In 1996 the landings amounted to about 80,000 specimens, but in 2008 the landings only amounted to 17,000 specimens or 109 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: Not established.

STOCK STATUS: The new data available for this stock are too sparse to revise the advice from last year.

MANAGEMENT AGREEMENTS: The objective of the Salmon Action Plan (SAP), as adopted by the former IBSFC, is to increase the natural production of wild Baltic salmon to at least 50% of the natural production capacity of each river by 2010, while retaining the catch level as high as possible. In addition, objectives state that the genetic diversity of the stocks should be maintained. The management objective concerned has expired in practice because catch options for 2007 mainly influence smolt year-classes beyond year 2010. No update of objectives has been set by the EU Commission after the former IBSFC Salmon Action Plan (SAP).

RECENT MANAGEMENT ADVICE: ICES recommends there should be no catch of wild Estonian salmon in 2010 in the Gulf of Finland.

Fisheries should only be permitted at sites where there is no chance of taking wild salmon from the Gulf of Finland stocks along with reared salmon. To improve selectivity of harvesting, coastal fisheries at sites likely to be on the migration paths of wild salmon from Estonian rivers should be prohibited. Poaching occurs in these rivers and must be stopped. Fishing in rivers and river mouths supporting wild stocks should be prevented.

This advice will not be updated until 2010 (for fishing in 2011) unless there is a significant change in the available data.

STECF COMMENTS: STECF agrees that there should be no catches of wild salmon in the Gulf of Finland.

1.10. Sea trout (*Salmo trutta*) in the Baltic Sea (Sub-div. 22-32)

FISHERIES: Most of the sea trout catches are taken as a by-catch in other fisheries. Off-shore migrating sea trout stocks are to a large extent taken as a by-catch in the salmon fishery, whereas those which migrate shorter distances are caught in fisheries targeting whitefish, pikeperch, and perch. Nominal sea trout landings have been decreasing since 2000, from 1452 t in 2000 to 558 t in 2008. Ban on driftnets (from Jan 2008) had a significant effect especially on Polish sea trout catches which were reduced from 525 t in 2007 to 172 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: Not established.

STOCK STATUS: The Baltic Sea contains approximately 1000 sea trout stocks. The status of these populations is very variable; a few populations appear to be in a good state, whereas many populations especially in the Gulf of Bothnia and Gulf of Finland appear to be weak.

MANAGEMENT AGREEMENTS: There are no management agreements or TAC set for the sea trout. Community and national regulations include inter alia minimum landing size, local and seasonal closures, and minimum mesh sizes for gillnet fishery.

RECENT MANAGEMENT ADVICE: ICES recommends immediate fishing restrictions to be enforced in the Gulf of Bothnia (ICES Subdivisions 30 and 31) and Gulf of Finland (ICES Subdivision 32), to safeguard the remaining wild sea trout populations in the region. Minimum mesh size for gillnets, and effort limitations should be implemented for the fisheries in the sea and in rivers carrying wild sea trout populations in order to decrease the exploitation rate.

Adequate fishing regulations should be enforced locally in ICES Subdivisions 29–32 to reduce the fishing mortality of sea trout: a minimum legal landing size of 65 cm would allow female fish to spawn at least once. Further, the problem of early catch of immature trout could be considerably reduced by prohibiting the use of mesh sizes below 50 mm (bar length). Gill net fishing should be totally prohibited or severely restricted both in rivers and at river mouths, where sea trout are found.

In the Main Basin, (ICES Subdivisions 22–29) habitat improvements by restoration are needed and accessibility to spawning and rearing areas should be improved in many rivers. Existing fishing restrictions (for example,

closed season, closed areas at river mouths, minimum landing size and minimum mesh sizes) should be maintained in order to protect trout populations.

STECF COMMENTS: STECF agrees that local fishing restrictions are required to safeguard the wild sea trout populations. STECF is not in a position to evaluate if the measures proposed by the ICES are adequate to ensure sustainable fisheries of sea trout.

1.11. Sprat (*Sprattus sprattus*) in IIIbcd, Baltic Sea (Sub-div. 22-32)

FISHERIES: All countries surrounding the Baltic Sea report landings of sprat. During the 1990s total catches increased considerably, from a level of 86,000 t in the 1990 to 529,000 t in 1997. Since then there has been a decrease and landings have since 2000 been fluctuating around 375,000 t. In 2008 total catches reached 381,000 t. Trawlers account for most of the catches. The increase in catches since 1992 is due to increased productivity in the stock and the development of a target pelagic fishery. Varying amounts of herring are taken as by-catch in the fisheries for sprat.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The age-structured assessment is based long-term catch data and three survey indices.

MANAGEMENT AGREEMENT: The IBSFC long-term management plan for the sprat stock was terminated in 2006. The present advice was given in relation to precautionary limits.

REFERENCE POINTS: The proposed precautionary reference point for F (F_{pa}) is set at 0.40; F_{lim} is not defined. An integrated ecosystem assessment shows a major shift in food web composition and in environmental drivers, and therefore the biomass reference points used in previous assessments were not considered applicable anymore. A candidate for reference point which is consistent with a high long term yields and low risk of depleting the productive potential of the stock is $F_y=0.40$.

STOCK STATUS:

Spawning biomass in relation to precautionary limits	Fishing mortality in relation to precautionary limits	Fishing mortality in relation to high long term yield	Fishing mortality in relation to agreed target reference points	Comment
Undefined	At risk	Overexploited	N/A	

In the absence of applicable biomass reference points, the state of the stock cannot be evaluated with regard to these. SSB has declined from a historic high level in the late 1990s to around 20 % above the long term average in 2008. Based on the most recent estimate of fishing mortality of 0.52, ICES classifies the stock at the risk to be harvested unsustainably.

RECENT MANAGEMENT ADVICE:

Exploitation boundaries in relation to precautionary limits: Fishing mortality in 2010 should be below $F_{pa} = 0.40$, corresponding to landings of less than 306 000 t.

STECF COMMENTS: STECF agrees with the ICES advice on the exploitation of Baltic sprat.

STECF notes that applying the rule for setting TAC proposed by the Commission (COM(2009) 224) the variation in the TAC should be limited to +/- 15 % and would result in a TAC of 339,150 t for 2010.

STECF notes that the last assessment shows similar estimates of SSB and fishing mortality as the 2008 assessment. The estimate of SSB in 2007 has been revised downwards by 9% and the F in 2007 has been revised upwards by 4%.

1.12. Turbot (*Psetta maxima*) in the Baltic Sea (Subdivisions 22-32)

FISHERIES: Turbot occurs mainly in the southern and western parts of the Baltic Proper. Therefore, most of the landings are reported for ICES Subdivisions 22-26. The total reported landings of turbot increased from 42 t

to 1,210 t between 1965 and 1996. From that high level the landings decreased to about 500 t in the 2000s. The total landings in 2008 of about 280t mean an increase by about 80 t from 2007.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: There are no precautionary reference points proposed for turbot in the Baltic.

STOCK STATUS: The stock status is unknown. The only information available for this stock is landing statistics.

MANAGEMENT OBJECTIVES

No management objectives have been defined for this stock.

RECENT MANAGEMENT ADVICE: The available data are insufficient for assessing the current stock size and exploitation, and ICES gives no management advice on the turbot stocks in the Baltic.

STECF COMMENTS: The low landings in recent years give rise to concern. However, it is not possible to judge if the decline in landings reflects a low stock level, a substantial reduction in fishing effort or a combination of the two.

2. Resources of the North Sea

2.1. Norway lobster (*Nephrops norvegicus*) - IIa (EU zone), IIIa and North Sea (EU zone)

Changes to the basis for advice on *Nephrops* assessed using Underwater TV (UWTV) surveys.

Since the 1990s there have been important developments in the methodology to assess the status of *Nephrops* stocks. The use of Underwater TV surveys (UWTV) has enabled the development of fishery independent indicators of abundance. STECF (2005) suggested that a combination of an absolute abundance estimate from an UWTV survey, in combination with a harvest rate (HR) based on $F_{0.1}$ from a combined sex length cohort analysis (LCA) and the mean weight and selection pattern from the commercial fishery could be used to calculate appropriate landings. Since then, ICES workshops on the UWTV technique have provided more detail on the assumptions and uncertainties associated with the approach. At the ICES ACOM meeting in June 2008 it was argued that the use of UWTV surveys for absolute abundance estimates could lead to an overestimation bias due to misidentification of burrows, habitat estimation and occupancy rate although it is possible that in some areas, these factors could lead to underestimation. A proposal that, as a precautionary measure, the estimated absolute abundance estimates be reduced by 25%, before being used for estimation of HR was made but ultimately rejected, as being more or less arbitrarily chosen. Because of these uncertainties, ICES did not (in 2008) base its advice for 2009 on estimates of absolute stock size in 2009. Instead, the general ICES advice for these *Nephrops* stocks is based on the UWTV surveys as relative indices, which in most cases suggest stability of the stocks.

However at the ICES Benchmark Workshop on *Nephrops* in 2009 major sources of bias were quantified for each survey and an overall bias correction factor derived which, when applied to the estimates of abundance from the UWTV survey, allows them to be treated as absolute abundance levels. The ICES workshop also concluded that the UWTV surveys detect burrows of *Nephrops* considerably smaller than the sizes of those taken by the fishery. Accordingly, for each FU, ICES has recalculated the harvest rates required to achieve the target fishing mortality on the fishable portion of the stock. For example if the target HR is 20% of the fishable stock but only 50% of the UWTV total stock size estimate is fishable, ICES has reduced the recommended HR by 50% so that the target rate remains at 20% of the fishable stock.

ICES has based its advice for 2010 on the decision rules outlined in the table below, with the objective of achieving exploitation rates between $F_{0.1}$ and F_{MAX} . To be able to evaluate the state of the stocks relative to the two reference points, ICES estimated for each of the stocks for which UWTV estimates were available, the HRs corresponding to $F_{0.1}$ and F_{MAX} .

F relative to $F_{0.1}$ and F_{MAX}	SSB Stable or Increasing	SSB Decreasing
$F > F_{MAX}$	Reduce F to F_{MAX}	Reduce F to $F_{0.1}$
$F_{MAX} > F > F_{0.1}$	Maintain current F	Reduce F to $F_{0.1}$
$F < F_{0.1}$	Increase F to $F_{0.1}$	Maintain current F

STECF comments on this approach are given in the section below and specific comments on the advice for each functional unit are given in the relevant section of this report.

STECF COMMENTS: STECF agrees with the findings of the recent TV survey workshops and the 2009 benchmark workshop that it is appropriate to treat the TV survey indices as estimates of absolute abundance of Nephrops.

The 2010 advice for the major Nephrops stocks (FUs) in the North Sea and other areas is now based on the harvest rate approach initially advocated by STECF. STECF also encourages establishing and developing UWTV surveys for other Nephrops functional units.

ICES has changed the basis for estimating HRs because there is a proportion of the stock that is observed by TV surveys that is not available to the gears that catch Nephrops. HRs are now based on the catch/fishable stock size ratio. STECF agrees with ICES that it is appropriate to estimate HRs on the catch/fishable size ratio. However, using such an approach implies historical HR estimates for each FU that are greater than were previously estimated, since previous estimates were based on the catch/total stock size ratio.

However, the evaluation of the state of the exploitation of the stocks in relation to the $F_{0.1}$ and F_{MAX} has for most of the stocks changed substantially and the harvest rate is now evaluated to be higher relative to the reference points than previously thought.

Regarding the TAC decision rule for Nephrops FUs advocated by ICES, STECF notes that this may lead to advice for radical changes to fishing opportunities simply as a consequence of the rule and the revised evaluation of the state of exploitation in relation to the reference points and not because of any significant change in stock size for that functional unit. This is particularly the case if the current harvest rate is assessed to be above F_{MAX} , and the stock is declining. In such cases, the decision rule stipulates that the TAC should be based on the fishing mortality rate corresponding to $F_{0.1}$. In most cases this will imply an immediate substantial reduction in F and in most cases a substantial reduction in TAC even though the stock may be well within safe biological limits. STECF furthermore notes that the harvest rule has not been evaluated against precautionary criteria.

STECF also notes that the HR options proposed by ICES use both $F_{0.1}$ and F_{MAX} as the basis for decision making on future fishing opportunities depending on the perceived trends in stock size. STECF considers that in the long-term, and to comply with the Johannesburg declaration the aim for management should be to exploit Nephrops at rates that will give rise to Maximum sustainable yield. However maximum sustainable yield reference points are not estimable for Nephrops and appropriate proxies need to be agreed. At present, STECF has no objective basis to determine the most appropriate proxy for Fmsy. However, until the use of candidate proxies for Fmsy have been fully evaluated, STECF **recommends** that as an interim measure $F_{0.1}$ be adopted as the precautionary target fishing mortality rate for Nephrops. STECF also **recommends** that a study be undertaken to investigate the utility of alternative candidate proxies for Fmsy.

As a consequence of the above rationale and recommendation, STECF considers that it is premature to use the decision rules advocated by ICES as a basis for setting fishing opportunities without a proper evaluation of the likely outcome of such a rule. In view of this, STECF **recommends** that the decision rules advocated by ICES should not form the basis of setting fishing opportunities for 2010 for those Nephrops FUs to which it has been applied. STECF further **recommends** that management plans be developed with the objective of achieving high long-term yields and low risk to the stocks. Such plans should be applicable to separate FUs for Nephrops.

STECF notes that the estimated HRs for Nephrops FUs imply that in some cases, the most recent harvest rate is significantly higher than $F_{0.1}$ (or even F_{MAX}) and that to set catch limits for 2010 in line with $F_{0.1}$ would imply large reductions in harvest rate and similar large reductions in fishing opportunities and revenue to the fleets that exploit Nephrops. STECF does not have the appropriate data and information to quantify the potential economic effects of such reductions. In addition, given that for most Nephrops FUs for which UWTV survey estimates are available, there does not seem to be any immediate biological risk to the stocks even at recently observed

harvest rates, incremental reductions in fishing mortality towards the F0.1 target would seem appropriate. STECF therefore suggests that fishing opportunities for each FU be set in line with successive annual adjustments in fishing mortality (HR) until F0.1 is realised.

STECF notes that the TAC decision rules proposed in the Commission's Communication on fishing opportunities for 2010 (COM (2009) 224) are intended to deliver successive annual reductions in fishing mortality along the lines suggested above and that these could be used as a basis for setting FU-specific TACs for Nephrops.

Nephrops Functional Units in the North Sea

Norway lobster (Nephrops) in the North sea (IV) is assessed in a number of different stock functional units (FU) treated as separate stocks, see below. However, for management purposes the North Sea is partitioned into 2 units only: The EU EEZ and Norwegian EEZ, each of which is treated as a single unit.

FU 9: Moray Firth	EU EEZ
FU 10: Noup	“
FU 7 Fladen ground	“
FU 32 Norwegian Deep	Norwegian EEZ
FU 6 Farn Deep	EU EEZ
FU8 Firth of Forth	“
FU 5 Botney Gut	“
FU 33 Horn's Reef	“

The Norwegian EEZ comprises only one FU, but the situation is complicated in the EU EEZ, where it is not possible to implement the specific biological advice for the different FUs where the management operates for the (single) EU EEZ of the North Sea. In the EU EEZ catches can be taken anywhere, and this could imply inappropriate harvest rates (HRs) from some parts. More importantly, vessels are free to move between grounds, which allow effort to develop on some grounds in a largely uncontrolled way. Management at the FU level could provide the controls to ensure that catch opportunities and effort are compatible and in line with the scale of the resources in each of the stocks defined by the Functional Units. Notice, that advice for 2010 based on 2009 assessments is only provided for those four FUs which are covered by UWTV surveys. The 2010 advice for FUs 5, 10, 32 and 33 is the same as the 2009 advice (provided as biennial advice in 2008).

STECF notes that in the North Sea (which comprises eight Nephrops Functional Units (FUs)) the present aggregated management approach (overall TAC for all FUs) runs the risk of unbalanced effort distribution. Adoption of management initiatives to ensure that effort can be appropriately controlled in smaller areas within the overall TAC area is recommended. Furthermore, STECF notes that the current aggregated management of all Nephrops FUs in the North Sea as a single unit is a major obstacle for a management complying with the Commissions Communication on Fishing opportunities for 2010 (COM (2009) 224) (see below).

The ICES advice is presented separately for each Functional Unit in the North Sea in sections *** to ***. There are increasing and significant landings from some isolated patches outside the Functional Units, most notably the Devil's Hole area. Overall landings in Subarea IV were around 22 000 t in 2008 (a decrease of 2500 t from 2007) of which landings from other rectangles amounted to more than 1,600 t. STECF agrees with ICES that the use of average landings of no more than 1500 t (2007-2008) could be considered as an allowance for the fishery in the 'other' rectangles.

2.1.1. Norway lobster (*Nephrops norvegicus*) in Skagerrak, Kattegat, IIIa.

FISHERIES: There are two Functional Units in this Management Area: a) Skagerrak (FU 3) and b) Kattegat (FU 4). The majority of landings are made by Denmark and Sweden, with Norway contributing only small landings from the Skagerrak. In more recent years minor landings have been taken by Germany. During the last 15 years, landings from IIIa varied between 3,000 t and 5,000 t. Peak landings of 5044 were recorded in 1998. In 2008 landings amounted to 4,857 t

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES and the data available include fishery data such as LPUE and biological sampling data such as length compositions from which mean sizes can be derived. Danish and Swedish UWTV surveys are currently being established and preliminary data for reliable estimates of abundance in IIIa may be available in 2010.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: All the available assessment data indicate, that the stock(s) in this management area are exploited at sustainable levels. However, the available information is inadequate to evaluate spawning stock or fishing mortality relative to risk, so strictly speaking the state of the stock is unknown. Large amount of small *Nephrops* in the catches (discards) 2007 may indicate strong recruitment in that year.

RECENT MANAGEMENT ADVICE: Biennial advice (for 2009 and 2010) for these two FUs were provided in 2008:

Given the apparent stability of the stocks, current levels of exploitation appear to be sustainable. The most recent assessment data compiled in 2009 do not indicate any changes in the state of the stock.

Due to uncertainty in the available data ICES is not able to reliably forecast catch. LPUE has shown an increasing trend but this is not necessarily an indication of increase in stock abundance, but may be a consequence of the current management system. There are no signs of overexploitation of *Nephrops* in IIIa.

ICES does not advise any specific catch options for this stock for 2009. ICES currently advises no catches for cod in IIIa, which is a significant by-catch species in the *Nephrops* fisheries. The current effort regulation (limiting days at sea for gears not using selective sorting grids) may increase the incentives to use sorting grids. This may reduce by-catch of cod.

STECF COMMENTS: STECF agrees with the ICES comments on the assessment and notes that no management advice has been provided. STECF notes that the mismatch between minimum landing size (40 mm CL in Division IIIa) and the selectivity of the many of the trawls in use results in large quantities of *Nephrops* being discarded. There are also important considerations concerning the by-catch of gadoids and the need to reduce these through appropriate selectivity measures in this fishery. STECF also notes that the use of two different minimum landing sizes for *Nephrops* in Divisions IIIa and IV potentially causes an enforcement and policy problem in countries where *Nephrops* from the two areas are being landed.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that *Nephrops* FU in IIIa can be classified under Category 11 on the basis that STECF has not advised on an appropriate catch level.

Accordingly STECF notes that the rule for category 11 implies the following option for TAC in 2010.

2010 TAC		Basis for Category classification
Category 11	4,400 t*	No STECF advice

* assuming 3-year average of recent catches

2.1.2. Norway lobster (*Nephrops norvegicus*) in Moray Firth (FU 9)

FISHERIES: Landings from this fishery are predominantly reported from Scotland, with very small contributions from England in the mid-1990s, but not recently. About three quarters of the landings are made by single-rig trawlers, a high proportion of which use a 70-mm mesh. In 1999, twin-rig vessels predominantly used a 100 mm mesh, with 90% of the twin-rig landings made using this mesh size. Legislative changes in 2000 permitted the use of an 80 mm mesh. Total estimated landings in 2008 were 1443 t.

Discarding rates averaged over the period 2006 to 2008 for this stock were about 6% by number. This represents a marked reduction in discarding rate compared to the average for the period 2003 to 2005.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on UWTV surveys of absolute abundance. Previous years' estimates of absolute abundance from UWTV were considered uncertain because of too high levels of unquantifiable bias. However at the ICES Benchmark Workshop on Nephrops in 2009 major sources of bias were quantified for each survey and an overall bias correction factor derived which, when applied to the estimates of abundance from the UWTV survey, allows them to be treated as absolute abundance levels.

PRECAUTIONARY REFERENCE POINTS: No biological reference points have been determined for this stock of *Nephrops*, instead, as mentioned in the introduction, F_{MAX} and $F_{0.1}$ are used as reference points

Reference points

<i>F</i> <i>reference</i> <i>point</i>	<i>Harvest</i> <i>ratio</i>
$F_{0.1}$	8.9%
F_{MAX}	16.6%

STOCK STATUS: The evidence from UWTV surveys suggests that the population is stable, but at a lower level than that in the period 2003-2005. The UWTV survey information, taken together with information showing stable mean sizes, suggest that the stock is being exploited sustainably.

RECENT MANAGEMENT ADVICE: The current fishery appears sustainable. ICES advises on the basis of exploitation boundaries in relation to high long-term yield and low risk of depletion of production potential that the Harvest Rate for Nephrops fisheries should not exceed $F(2008)$. This corresponds to landings of no more than 1 372 tonnes for the Moray Firth stock.

STECF COMMENTS: STECF disagrees with the ICES advice since it is based on the TAC decision rule adopted by ICES. STECF considers that a harvest rate corresponding to $F_{0.1}$ as a proxy for F_{MSY} should be the long-term target and that the short term aim should be to adjust the harvest rate towards that target.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that in order to comply with the objectives of the precautionary approach as interpreted by ICES, then in accordance with the Commissions Communication on Fishing opportunities for 2010 (COM (2009) 224), the *Nephrops* in Moray of Firth (FU 9) should be classified as a category 6 stock.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 6	NE*	No TAC set for separate functional units.

* NE- not estimable

STECF notes that the TAC corresponding to the rule for category 6 stocks cannot be estimated for Nephrops in FU 9 since there is no separate TAC set for this functional unit.

2.1.3. Norway lobster (*Nephrops norvegicus*) in the Noup (FU 10)

FISHERIES: Landings from this fishery are predominantly reported from Scotland. Total landings in 2008 amounted to 173 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on LPUEs and size composition data. There is only limited UWTV survey data on abundance and there is no assessment based on UWTV survey data. Biennial advice (for 2009 and 2010) for this FU was provided in 2008.

PRECAUTIONARY REFERENCE POINTS: No reference points are available for this stock.

STOCK STATUS: The LPUE indicator is increasing and mean length in the catches is stable. According to the 2008 assessment current levels of exploitation appear to be sustainable.

RECENT MANAGEMENT ADVICE: Given the apparent stability of the stock, current levels of exploitation and effort appear to be sustainable. ICES maintains the previous advice (based on the average landings 2003-2005) for the Noup fishery - that is less than 240 t in 2009 and 2010. This amount is almost identical to the long-term average for the time series.

STECF COMMENTS: STECF agrees with the advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that in order to comply with the objectives of the precautionary approach as interpreted by ICES, then in accordance with the Commissions Communication on Fishing opportunities for 2010 (COM (2009) 224), the *Nephrops* in the Noup (FU 10) should be classified as a category 6 stock.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 6	NE*	No TAC set for separate functional units.

* NE- not estimable

STECF notes that the TAC corresponding to the rule for category 6 stocks cannot be estimated for *Nephrops* in FU 10 since there is no separate TAC set for this functional unit.

2.1.4. Norway lobster (*Nephrops norvegicus*) in Fladen Ground (FU 7) (Division IVa)

FISHERIES: There is only one Functional Unit in this area: FU 7 (Fladen Ground). Small quantities of landings are taken outside the main Fladen Ground Functional Unit. The fleet fishing the Fladen Ground for *Nephrops* comprises approximately 100 trawlers, which are predominantly Scottish (> 97%), based along the Scottish NE coast. Nearly three quarters of the landings are made by single-rig vessels and one-quarter by twin-rig vessels. 80mm mesh is the commonest mesh size. Nearly 40% of the *Nephrops* landings at Fladen are reported as by-catch, in fisheries which may be described as mixed. In 2008 total landings amounted to more than 12,000 t. of which U.K (Scotland) accounted for 99 %, the remaining part being Danish. Discarding rates averaged over the period 2005 to 2007 for this stock were 18% by number, or 11% by weight.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based UWTV surveys of absolute abundance. Previous years' estimates of absolute estimate of abundance from UWTV were considered uncertain because of too high levels of unquantifiable bias. However at the ICES Benchmark Workshop on *Nephrops* in 2009 major sources of bias were quantified for each survey and an overall bias correction factor derived which, when applied to the estimates of abundance from the UWTV survey, allows them to be treated as absolute abundance levels.

PRECAUTIONARY REFERENCE POINTS: No biological reference points have been determined for this stock of *Nephrops*, instead, as mentioned in the introduction, F_{MAX} and $F_{0.1}$ are used as reference points

Reference points

<i>F</i> reference point	Harvest ratio
$F_{0.1}$	9.3%
F_{MAX}	15.8%

STOCK STATUS: UWTV observations indicate that the stock is fluctuating without obvious trend with estimates for the last 2 years increasing to the highest abundance in the series. Considering the UWTV result alongside the indications of stable or slightly increasing mean sizes in the length compositions of catches (of individuals >35mm carapace length) suggests that the stock is being exploited sustainably. The decline in mean length of smaller individuals in the catch may be indicative of recent good recruitment.

RECENT MANAGEMENT ADVICE: The current fishery appears sustainable. ICES advises on the basis of exploitation boundaries in relation to high long-term yield and low risk of depletion of production potential that the Harvest Rate for *Nephrops* fisheries should not exceed $F_{0.1}$. This corresponds to landings of no more than 16,419t for the Fladen Ground.

STECF COMMENTS: STECF agrees with the ICES advice, that effort should not increase relative as not to exceed $F_{0.1}$.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that in order to comply with the objectives of the precautionary approach as interpreted by ICES, then in accordance with the Commission Communication on Fishing opportunities for 2010 (COM (2009) 224), the *Nephrops* in Fladen Ground (FU 7) should be classified as a category 1 stock.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 1	NE*	No TAC set for separate functional units.

* NE- not estimable

STECF notes that the TAC corresponding to the rule for category 1 stocks cannot be estimated for *Nephrops* in FU 07 since there is no separate TAC set for this functional unit.

2.1.5. Norway lobster (*Nephrops norvegicus*) in the Norwegian Deep, FU 32 (Division IVa, East of 2° E + rectangles 43 F5-F7).

FISHERIES: Landings from this area in 2008 were 675 t, a 10 % decline compared to 2007 landings. The majority of the landings from this FU are made by Denmark (> 80%) and Norway. Since 2002 annual landings have decreased from around 1200 t to less than 700 t and this decrease is due to decreases in Danish landings.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Information on this stock is inadequate to provide advice based on precautionary limits. Biennial advice (for 2009 and 2010) for these two FUs were provided in 2008. The perception of the stock status is based on Danish LPUE data.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been determined for this stock.

STOCK STATUS: Landings per unit effort (LPUE) have been relatively stable over the last 14 years and suggest that current levels of exploitation are sustainable. A slight increase in mean size in the catches in 2007 could have indicated a reduced exploitation pressure.

RECENT MANAGEMENT ADVICE: The current fishery appears sustainable. Therefore, ICES has recommended that effort should not be allowed to increase.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes the possibility, that only part of the stock is exploited at present, considering that the sediment maps indicate that there may be scope for the fishery expand into new grounds. STECF also notes the lack of survey data for this stock.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, Norway lobster (*Nephrops norvegicus*) in the Norwegian Deep, FU 32 cannot be classified under any of the categories listed.

2.1.6. Norway lobster (*Nephrops norvegicus*) in the Farn Deep (FU 6)

FISHERIES: Total landings from Farn decreased dramatically in 2008: from 3,000 t in 2007 to only 1213 t in 2008 a decline of around 60% compared to 2007 landings and 75% compared to 2006 landings. The UK fleet has accounted for virtually all landings from the Farn Deeps. Estimated discarding during this period has fluctuated around 40% by weight of the catch in the Farn Deeps.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based UWTV surveys of absolute abundance. Previous years' estimates of absolute estimate of abundance from UWTV were considered uncertain because of too high levels of unquantifiable bias. However at the ICES Benchmark Workshop on *Nephrops* in 2009 major sources of bias were quantified for each survey and an overall bias correction factor derived which, when applied to the estimates of abundance from the UWTV survey, allows them to be treated as absolute abundance levels.

PRECAUTIONARY REFERENCE POINTS: No biological reference points have been proposed for this stock, instead, as mentioned in the introduction, F_{MAX} and $F_{0.1}$ are used as reference points

Reference points

<i>F</i> reference point	<i>Harvest</i> ratio
$F_{0.1}$	8.2%
F_{MAX}	13.3%

STOCK STATUS: The UWTV survey in 2008, fishery data and length frequency data all point to the stock at the start of the 2008 fishing season continuing to be at the low levels in 2007. Recruitment signals for *Nephrops* in 2008 appear to indicate low recruitment.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to high long-term yield and low risk of depletion of production potential that the Harvest Rate for *Nephrops* fisheries should not exceed F_{2008} . This corresponds to landings of no more than 1 210 t for the Farn Deeps stock.

STECF COMMENTS: STECF agrees with ICES on its evaluation of the state of the stock in this FU. And given the current stock signals for the Farn Deeps, STECF also agrees that effort should not exceed the 2008 level even if this corresponds to a F-level below $F_{0.1}$. This implies a HR of 7.6 %.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that *Nephrops* in Farn Deep (FU 06) can be classified under Category 1 on the basis that the stock is exploited at a rate lower than $F_{0.1}$.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 1	NE*	No TAC set for separate functional units.

* **NE- not estimable** -STECF notes that the predicted catch for 2010 corresponding to a fishing mortality rate of $F_{0.1}$ for FU 6 is 1305 t. However, STECF advises that applying the rule for Category 1 stocks to the Fishery for *Nephrops* in the Farn Deeps is not appropriate, given that this would imply an increase in fishing mortality above current levels at a time when there are clear indications that the stock is at a low level. STECF therefore reiterates that it agrees with the advice from ICES that fishing mortality should not exceed F_{2008} . This implies a catch for FU6 of 1210 t for 2010.

2.1.7. Norway lobster (*Nephrops norvegicus*) in Firth of Forth (FU 8)

FISHERIES: Landings from the Firth of Forth fishery are predominantly reported from Scotland, with very small contributions from England. The area is periodically visited by vessels from other parts of the UK. Estimated discarding rates are 43% by number (24% by weight) in the Firth of Forth. Similar to levels recorded since the beginning of the data series in 1985. In the 3 recent years annual landings have been around 2500 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based UWTV surveys of absolute abundance. Previous years' estimates of absolute estimate of abundance from UWTV were considered uncertain because of too high levels of unquantifiable bias. However at the ICES

Benchmark Workshop on *Nephrops* in 2009 major sources of bias were quantified for each survey and an overall bias correction factor derived which, when applied to the estimates of abundance from the UWTV survey, allows them to be treated as absolute abundance levels.

PRECAUTIONARY REFERENCE POINTS: No biological reference points have been proposed for this stock. Instead, as mentioned in the introduction, F_{MAX} and $F_{0.1}$ are used as reference points

Reference points

<i>F</i> reference point	Harvest ratio
$F_{0.1}$	8.0%
F_{MAX}	13.7%

STOCK STATUS: The evidence from the UWTV survey suggests that the population has been at a relatively high level since 2003. The UWTV survey information, taken together with information showing stable mean sizes, suggest that the stock is being exploited sustainably.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to high long-term yield and low risk of depletion of production potential that the Harvest Rate for *Nephrops* fisheries should not exceed F_{MAX} . For the Firth of Forth stock this corresponds to landings of no more than 1,567 tonnes.

STECF COMMENTS: STECF disagrees with the ICES advice since it is based on the TAC decision rule adopted by ICES. STECF considers that a harvest rate corresponding to $F_{0.1}$ as a proxy for F_{MSY} should be the long-term target and that the short term aim should be to adjust the harvest rate towards that target. STECF also notes that *Nephrops* discard rates in the Firth of Forth are high and there is a need to reduce these and to improve the exploitation pattern. An additional reason for suggesting improved selectivity in this area is to reduce by-catch of other fish species.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that in order to comply with the objectives of the precautionary approach as interpreted by ICES, then in accordance with the Commissions Communication on Fishing opportunities for 2010 (COM (2009) 224), the *Nephrops* in the Firth of Forth (FU8) should be classified as a category 6 stock.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 6	NE*	No TAC set for separate functional units.

* NE- not estimable

STECF notes that the TAC corresponding to the rule for category 6 stocks cannot be estimated for *Nephrops* in FU 08 since there is no separate TAC set for this functional unit.

2.1.8. Norway lobster (*Nephrops norvegicus*) in Botney Gut (FU 5).

FISHERIES: Landings from Botney Gut were 962 t in 2008. Up to 1995, the Belgian fleet used to take over 75% of the international landings from this stock, but since then, its share has dropped to less than 6%. Long-term effort of the Belgian *Nephrops* fleet has shown an almost continuous decrease since the all-time high in the early 1990s. In 2008 around 30% of the total international landings were taken by Dutch trawlers for first sale in the Netherlands or in Belgium, and more than 50 % by UK trawlers. STECF notices that there has been a considerable increase in UK landings from this FU in the same period as the landings from Farn has decreased.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Biennial advice (for 2009 and 2010) for this FU was provided in 2008. Information on this FU is considered inadequate to provide advice based on precautionary limits. The perception of the stock is based on development in LPUEs

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been determined for this stock.

STOCK STATUS: The state of this stock is unknown. LPUE indicators show different trends for different fleets and not all of the indicators have been updated for 2006 and 2007.

RECENT MANAGEMENT ADVICE: There are no management objectives for this fishery. The state of the stock is unknown. ICES recommends that the level of effort should not be allowed to increase. **STECF COMMENTS:** STECF agrees with the advice from ICES. STECF notes that for this FU assessment data have become sparse in the last 2 years. The available LPUE figures from the Danish fisheries (continuous) and Belgian fisheries (up to 2005) must be viewed very cautiously as stock indicators.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, Norway lobster (*Nephrops norvegicus*) in Botney Gut (FU 52) cannot be classified under any of the categories listed.

2.1.9. Norway lobster (*Nephrops norvegicus*) in Horns Reef (FU 33)

FISHERIES: For several years Denmark was the only country exploiting *Nephrops* in this FU, and accounted for more than 90% of total landings up to 2005. However in recent years Germany and Netherlands have expanded their share of this stock. In 2007 total landings amounted to 1,467 t, and were the highest recorded. In 2008 landings declined to a total of 1096 t

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Biennial advice (for 2009 and 2010) for this FU was provided in 2008. Information on this stock is considered inadequate to provide advice based on precautionary limits. The perception of the stock is based on LPUE and length distribution in the catches.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been determined for this stock.

STOCK STATUS: The state of this stock is unknown. The LPUEs from major fisheries does not indicate any decline in availability.

RECENT MANAGEMENT ADVICE: There are no management objectives for this fishery. ICES recommend that the level of exploitation, i.e. effort on this stock should not be increased.

STECF COMMENTS: STECF agrees with the advice from ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, Norway lobster (*Nephrops norvegicus*) in Horns Reef (FU 33) cannot be classified under any of the categories listed.

2.2. Northern shrimp (*Pandalus borealis*) on Fladen Ground (Division IVa)

FISHERIES: In the EU zone of the North Sea, *Pandalus* on the Fladen Ground (Div. IVa) is the main shrimp stock exploited, which has been exploited. This stock has been exploited mainly by Danish and UK trawlers with the majority of landings taken by the Danish fleet. Historically, large fluctuations in this fishery have been frequent, for instance between 1990 and 2000 annual landings ranged between 500 t and 6000 t. However since 2000 a continuous declining trend is evident, and in 2004 and 2005 recorded landings dropped to below 25 t. No catches were recorded in 2006-2008. Information from the fishing industry in 2004 gives the explanation that this decline is caused by low shrimp abundance, low prices on small shrimp characteristic for the Fladen Ground and high fuel prices.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No assessment of this stock has been made since 1992, due to insufficient assessment data.

PRECAUTIONARY REFERENCE POINTS: There is no basis for defining precautionary reference points for this stock.

STOCK STATUS: There is a total lack of separate, fishery independent data. The most recent analytical assessment of this stock was presented in the 1992 ACFM Report (ICES, 1992). Landings have declined since 2000, and since 2006 no catches have been recorded. Part of the explanation for this development is the low price for shrimp combined with the rather high fuel costs. No monitoring of this stock has taken place, and recent years' drop in landings is at least partly due to a decline demand for these shrimp. However, it cannot be ruled out that the drop also reflects a decline in the stock.

RECENT MANAGEMENT ADVICE: No stock-specific management advice for 2010 is given by ICES. In the absence of information on stock development, ICES recommends that when/if the fishery on this stock begins, the effort should not increase to levels above the average for the years prior to the present absence of fishing activities and that the fishery must be accompanied by mandatory programmes to collect catch and effort data on both target and by-catch fish.

STECF COMMENTS: STECF agrees with the ICES recommendation

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that in order to comply with the objectives of the precautionary approach as interpreted by ICES, then in accordance with the Commissions Communication on Fishing opportunities for 2010 (COM (2009) 224), Northern shrimp (*Pandalus borealis*) on Fladen Ground (Division IVa) should be classified as a category 11 stock.

Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	NE*	No Advice, TAC based on recent catch levels.

***NE- not estimable** – STECF notes that , **if fisheries on this stock are resumed**, ICES recommends that effort should not be allowed to expand to levels above the average for the years prior to the present absence of fishing activities (1999-2003), corresponding to average landings of 1400 t.

2.3. Northern shrimp (*Pandalus borealis*) in Division IIIa and Division IVa East (Skagerrak and Norwegian Deep)

FISHERIES: *Pandalus borealis* is fished by bottom trawls at 150–400 m depth throughout the year by Danish, Norwegian and Swedish fleets. Total landings have varied between 10,000 and 15,000 t in the period 1985-2008. Discarding of small shrimp takes place, mainly due to high grading. In 2008 total landings were around 13000 t, while estimated catches (including discards) were around 16,400 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. In recent years several assessment models, including both cohort based and stock production models, have been applied for this stock. A major problem has been (and still is) to obtain realistic data for the predation mortality on this stock, which is believed to have stronger influence on the stock fluctuations than the fishery.

PRECAUTIONARY REFERENCE POINTS: Limit reference points have not been defined for this stock.

STOCK STATUS: As no reference points are defined, the state of the stock cannot be evaluated with regard to biological reference points, and the state of the stock is uncertain. The LPUE indices indicate that the stock has been fluctuating without any clear trends since the mid-1990s. However, abundance indices from Norwegian survey indicate a decrease since 2007 and recruitment indices (as 1 year old) from the Norwegian survey indicate a decrease since 2007, which may imply a further decline in biomass in 2010.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to precautionary considerations that the total landings from IIIa and IVa East in 2010 should not be increased above the 2008 level of 13 000 t (corresponding to an estimated catch level of 15000-16000 t).

STECF COMMENTS: STECF agrees with ICES that the state of the stock is uncertain and that survey indices indicate decline in both recruitment and stock biomass in recent years. However, considering fluctuations since 1990s, both in recruitment and stock size the magnitude of recent years downward trends do not exceed up- and down-fluctuation in earlier years. In relation to precautionary considerations STECF also agrees with ICES in that the management of this stock should address the discarding of small shrimps, which occurs mainly due to high-grading as a consequence of restrictive TACs. Furthermore, STECF endorses that sorting grids facilitating the escape of fish should be mandatory in this fishery as they are in all other *Pandalus borealis* fisheries in the North Atlantic.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that in order to comply with the objectives of the precautionary approach as interpreted by ICES, then in accordance with the Commissions Communication on Fishing opportunities for 2010 (COM (2009) 224), Northern shrimp (*Pandalus borealis*) Division IIIa (West) and Division IVa East, should be classified as a category 6 stock.

Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

	2010 TAC *	Basis
Category 6	14110 t	Catch advice based on rule 5b in Annex III. It is, however, noticed that the data series is insufficient for correct application of this rule.
* - No TAC set for <i>Pandalus Borealis</i> in this area		

2.4. Cod (*Gadus morhua*) in the Kattegat

FISHERIES: Cod in the Kattegat is exploited by Denmark, Sweden, and Germany. The fishery is conducted by both trawl and gillnets. Landings fluctuated between 4,000 and 22,000 t (1971-2001). Landings have decreased continuously since then. Reported landings were 449 t in 2008. Fishery-independent information indicates that removals from the stock are substantially higher than reported landings and that the mismatch between TAC/official landings and the total removals has increased in the most recent years.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is considered indicative of trends only. The assessment is based on the recently developed stochastic state-space model (SAM) that provides statistically sound estimates of uncertainty in the model results. The model allows estimating potential additional removals from the stock, not represented by reported landings. The stock estimates for these years consequently rely more on survey information.

MANAGEMENT AGREEMENT: The EU has adopted a long-term plan for cod stocks and the fisheries exploiting those stocks (Council Regulation (EC) 1342/2008). This regulation repeals the recovery plans in Regulation (EC) No 423/2004, and has the objective of ensuring the sustainable exploitation of the cod stocks on the basis of maximum sustainable yield while maintaining a target fishing mortality of 0.4 on specified age groups.

PRECAUTIONARY REFERENCE POINTS: $B_{pa} = 10,500$ t, $B_{lim} = 6,400$, F_{pa} and F_{lim} are no longer defined.

STOCK STATUS: The assessment is indicative of trends. Based on the most recent estimates of SSB (in 2009) ICES classifies the stock as suffering reduced reproductive capacity. The SSB trend indicates a fivefold decrease since 1970 and SSB has been at a historically low level since the early 2000s. Current level of fishing mortality is unknown. Recruitment in recent years has been the lowest in the time series.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of Exploitation boundaries in relation to precautionary considerations that there should be no catches of this stock in 2010.

Other considerations:

Exploitation boundaries in relation to existing management plans: According to the long-term management plan, the fishing mortality in 2010 shall be reduced by 25 % compared with the fishing mortality rate in 2009, unless the target 0.4 is reached. The current level of fishing mortality on cod in the Kattegat cannot be reliably estimated.

Where it is advised that the catches of cod should be reduced to the lowest possible level, the TACs shall be set according to a 25 % reduction compared to the TAC in the previous year, that corresponds to a TAC at 379 tonnes in 2010.

Exploitation boundaries in relation to precautionary considerations: Taking into account the current perception of the stock abundance and recruitment, fishing at any level will involve a risk of further the stock remaining depleted.

STECF COMMENTS:

STECF agrees with ICES advice that on the basis of exploitation boundaries in relation to precautionary considerations, there should be no fishing on Cod in the Kattegat.

STECF notes that this stock is subject to the provisions of the cod long-term management plan, Council Regulation (EC) 1342/2008. Since STECF is unable to derive reliable estimates of fishing mortality for this stock and is therefore unable to provide a quantitative catch forecast, the TAC for 2010 should be set according to Article 9. Furthermore since the advice is for no fishing, Article 9a applies.

STECF notes it is unclear from ICES advice whether ICES considers the cod long-term management plan (Council Regulation (EC) 1342/2008) to be consistent with the precautionary approach. ICES states that a TAC constraint alone (under Article 9) is not precautionary. However, under article 12 of the management plan fishing effort is adjusted by the same percentage as the TAC.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (Council Regulation (EC) 1342/2008):

STECF notes that for this plan as applied to the Kattegat stock an evaluation was inconclusive with respect to the precautionary approach. STECF therefore notes that the TAC corresponding to the relevant rule in the management plan is 379 t.

2.5. Cod (*Gadus morhua*), in the North Sea (IIa, IIIa Skagerrak, IV and VIId)

FISHERIES: North Sea cod are exploited by fleets from Belgium, Denmark, The Netherlands, Germany, France, Sweden, Norway, and UK. Small catches are also taken by fleets from Poland and the Faroe Islands. Cod are taken mainly by mixed fisheries using otter trawls, seine nets, gill nets, long-lines and beam trawl. The stock is managed by TAC through joint negotiation between the EU and Norway, technical and supporting effort regulations in units of days at sea per vessel since 2003. Historically, landings peaked at about 350,000 t in the early 1970s, subsequently declining to around 200,000 t by 1988. From 1989 until 1998, landings remained between about 100,000 t and 140,000 t. Reported landings decreased sharply in 1999 to 96,000 t, and then declined steadily to 24,400 t in 2007. Reported landings for 2008 were about 26,800 t. The assessment area for this stock includes ICES Divisions IIIa (Skagerrak), VIId and Sub-area IV, which are different management areas and for which separate TACs are set.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment used the age-based model (B-ADAPT) incorporating landings and discards, and calibrated with two survey indices (from IBTS quarter 1 and quarter 3 surveys). For ICES Subarea IV and Divisions VIId, discards were estimated from the Scottish discards sampling program up until 2005, raised to the total international fleet. For 2006, Denmark provided its own discard estimates. For 2007 and 2008 Scottish, Danish, German, and England & Wales discard estimates were combined and used to raise landings-at-age for remaining nations in Subarea IV. Discards in Division IIIa were based on observer estimates. For 2006-2008, Danish and Swedish discard estimates were combined to raise landings-at-age from the remaining nations in Division IIIa.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points for fishing mortality and spawning stock biomass have been agreed as $F_{pa} = 0.65$, $F_{lim} = 0.86$, $B_{pa} = 150,000t$ and $B_{lim} = 70,000 t$.

MANAGEMENT AGREEMENT: In 2005 the EU and Norway revised their initial agreement from 1999 and agreed to implement a long-term management plan for the cod stock. This plan was again updated in December 2008 and entered into force on 1 January 2009. The plan aims to be consistent with the precautionary approach and is intended to provide for sustainable fisheries and high yield leading to a target fishing mortality to 0.4. The main changes between the 2009 and 2005 plans is a phasing (transitional and long-term phase) and the inclusion of an F reduction fraction. That is:

Transitional arrangement:

F will be reduced as follows: 75 % of F in 2008 for the TACs in 2009, 65 % of F in 2008 for the TACs in 2010, and applying successive decrements of 10 % for the following years.

The transitional phase ends as from the first year in which the long-term management arrangement leads to a higher TAC than the transitional arrangement.

F reduction fraction

If the size of the stock on 1 January of the year prior to the year of application of the TACs is:

- Above the precautionary spawning biomass level, the TACs shall correspond to a fishing mortality rate of 0.4 on appropriate age groups;
- Between the minimum spawning biomass level and the precautionary spawning biomass level, the TACs shall not exceed a level corresponding to a fishing mortality rate on appropriate age groups equal to the following formula:
- $0.4 - (0.2 * (\text{Precautionary spawning biomass level} - \text{spawning biomass}) / (\text{Precautionary spawning biomass level} - \text{minimum spawning biomass level}))$
- At or below the limit spawning biomass level, the TAC shall not exceed a level corresponding to a fishing mortality rate of 0.2 on appropriate age groups.

The plan shall be subject to triennial review, the first of which will take place before 31 December 2011.

The EU has adopted a long-term plan for this stock with the same aims as the EU-Norway plan (Council Regulation (EC) 1342/2008).

ICES has evaluated the EU management plan in 2009 and considers it to be in accordance with the precautionary approach if it is implemented and enforced adequately. Discarding in excess of the assumptions under the management plan will affect the effectiveness of the plan. The evaluation is most sensitive to assumptions about implementation error (i.e. TAC and effort overshoot and the consequent increase in discards).

STOCK STATUS: Based on the most recent estimate of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as suffering reduced reproductive capacity and as being at risk of being harvested unsustainably. SSB has increased since its historical low in 2006, but remains below B_{lim} . Fishing mortality declined after 2000, but in 2008 increased, predominantly as a consequence of increased discarding and is currently estimated to be between F_{lim} and F_{pa} . The 2005 year-class is estimated to be one of the most abundant amongst the recent below-average year-classes. The 2008 year-class is estimated to be one of the lowest in the series.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the management plan on an F in 2010 that is 65% of the F in 2008 ($F_{2010}=0.51$), catches should be less 66 400 t. Assuming discards rates as observed in 2008, this implies landings of less than 40 300 t in 2010. This presumes that the objectives of the management plan are realised which assumes reduction in F and control of catches in 2009 and 2010.

Other considerations:

Exploitation boundaries in relation to existing management plans: The plan stipulates that, based on the assumption that the 25% reduction in F in 2009 has been effective in reducing F_{2009} to 25% below F_{2008} , the following criteria be met, in order of increasing priority:

- (a) TAC₂₀₀₉ should not exceed a level that results in F_{2010} being above 65% of F_{2008} ;
- (b) There should be no more than a 20% change from TAC₂₀₀₉ to TAC₂₀₁₀;

These criteria imply catches should be less 66 400 t. Assuming discards rates as observed in 2008, this implies landings of less than 40 300 t in 2010. This is less than the 20% increase constraint ($1.2 \times \text{TAC}_{2009} = 41\,500\text{t}$) for Area IV and Subdivisions VIIId and IIIa (Skagerrak).

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: F_{2008} is above the levels that would lead to high long-term yield and low risk of depletion of production potential, taking ecosystem effects into account.

Exploitation boundaries in relation to precautionary limits: Given the low stock size and recent poor recruitment, the stock cannot be rebuilt to B_{pa} at the start of 2011 even with a zero catch. However, simulations indicate that with the recent poor recruitment, a zero catch in 2010 and 2011 is likely to achieve the rebuilding of the stock to B_{pa} by 2012.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that ICES has evaluated the EU cod long-term management plan (Council Regulation (EC) 1342/2008) and found it consistent with the precautionary approach for the cod stock in the North Sea, the Skagerrak and the eastern Channel. STECF further notes that as the rules governing the setting of TACs are identical between the EU management plan and EU-Norway agreement.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (Council Regulation (EC) 1342/2008).

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed management plan the TAC for 2010 should be set at 40,300 t.

2.5.1. Special request on Cod in the North Sea, Skagerrak and Eastern English Channel

STECF is requested to advise whether the ICES forecast of landings in 2010 includes sources of fishing mortality other than landings that are counted against TAC (and if so, how much).

Furthermore, DG MARE is considering asking STECF in autumn to review the 2010 estimates of discards and unallocated landings based on discard data collected in the first half of 2009. Please advise on the minimum data needs and data sources that would allow STECF to perform such a review.

STECF response

STECF is unable to respond to this request at this time

2.6. Haddock (*Melanogrammus aeglefinus*) in IIa (EU zone), in Sub-area IV (North Sea) and Division IIIa (Skagerrak- Kattegat)

FISHERIES: North Sea haddock is exploited predominantly by fleets from the UK (Scotland), Norway and Denmark. Most landings are for human consumption and are taken by towed gears, although there is a small by-catch in the small-mesh industrial fisheries. Substantial quantities are discarded in some years when new year-classes recruit to the fishery. Over 1963-2006, catches have ranged from 55,000 t to 930,000 t. In recent years catches have decreased and the estimates for 2005 to 2008 represent the lowest on record. A contributory factor to the lower catches in recent years has been the maintenance of low fishing mortality rate.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The age-based assessment model (XSA) is calibrated with three survey indices. Discards and industrial by-catch data were included in the assessment. Discards were estimated from the discards sampling programme from several countries, with most observations coming from Scotland.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.70$, $B_{pa} = 140,000$ t.

STOCK STATUS: Based on the most recent estimate of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and being harvested sustainably. SSB in 2009 is estimated to be above B_{pa} , although SSB has been declining since 2002. Fishing mortality in 2008 is estimated to be below F_{pa} , and below the target F_{HCR} (0.3) specified in the EU-Norway management plan. Recruitment is characterized by occasional large yield-classes, the last of which was the strong 1999 year-class. Apart from the 2005 year-class which is about average, recent recruitment has been poor.

MANAGEMENT AGREEMENT: In 1999 the EU and Norway agreed to implement a long-term management plan for the haddock stock, which is consistent with the precautionary approach and which is intended to constrain harvesting within safe biological limits ($SSB > B_{lim}$) and is designed to provide for sustainable fisheries and high potential yield ($F_{HCR} = 0.3$). A revised management plan was implemented in January 2009.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the management plan that implies landings in 2010 of 38 000 t, including industrial by-catch.

Other considerations:

Exploitation boundaries in relation to existing management plans: Following the agreed management plan implies landings in 2010 of 38 000 t, which is expected to lead to an SSB of 154 000 t in 2011. The constraint on interannual TAC variability ($\pm 15\%$) is invoked in this case: the suggested 2010 landings represent a 15% decrease from the 2009 quota. The management plan can be provisionally accepted as precautionary.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential, and considering ecosystem effects: The current fishing mortality is estimated at 0.25, which is below the target rate expected to lead to high long-term yields ($F = 0.3$).

Exploitation boundaries in relation to precautionary reference points: Catches of 62 000 t implying landings of less than 49 000 t in 2010 would reduce SSB in 2011 to B_{pa} corresponding to a doubling of Fishing mortality.

STECF COMMENTS: STECF agrees with ICES advice that on the basis of the management plan landings in 2010 should be 38 000 t, including industrial by-catch.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED EU AND NORWAY MANAGEMENT PLAN.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed EU and Norway management plan the TAC for 2010 should be set at 38,000 t.

2.7. Saithe (*Pollachius virens*) in Divisions IIa (EU zone), IIIa, Subareas IV (North Sea) and VI (West of Scotland).

FISHERIES: In the various areas over which this stock is distributed, saithe are primarily taken in a directed shelf-edge trawl fishery, and are also taken as part of the mixed roundfish fishery. The stock is exploited by nations including Norway, France, Germany, the UK, Ireland, Spain and Denmark. Between 1967-2006, ICES Working Group reported landings have varied between 88,326t and 34,3967t and have been relatively stable over the last 19 years (mostly just over 100,000 t). In 2008 landings were 119,100 t. The stock is managed by TAC. Separate TACs are set for Saithe in IIa (EU zone), IIIa, North Sea combined (Sub-area IV) and Sub-area VI.

The Norwegian fisheries authorities annulled the maximal vessel saithe quota for bottom trawlers and pelagic trawlers in the North Sea and Skagerrak from 30th April 2008. On request from the industry, Norwegian authorities are now discussing the possibilities of opening the summer closure for the saithe fishery (23 June–3 August) in 2008. An opening of this fishery may influence the exploitation pattern as the large 2004 cohort will then be available for the fleet, despite the use of cod-ends with mesh size of 135 mm.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment (XSA) calibrated using data from two commercial cpue series and indices from two surveys. There are no discard estimates for the majority of this fishery. Discarding of saithe occurs in the non-targeted fisheries, but the level of discard is considered to be small compared to the total catch of saithe.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.40$, $F_{lim} = 0.6$, $B_{pa} = 200,000t$ and $B_{lim} = 106,000 t$ respectively.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and being harvested sustainably. SSB is estimated to have been above B_{pa} since 2001. From 2001 onwards, F has been at or below the target fishing mortality of 0.3.

MANAGEMENT AGREEMENT:

In 2008 EU and Norway renewed the existing agreement on “a long-term plan for the saithe stock in the Skagerrak, the North Sea and west of Scotland, which is consistent with a precautionary approach and designed to provide for sustainable fisheries and high yields. The plan shall consist of the following elements.

1. Every effort shall be made to maintain a minimum level of Spawning Stock Biomass (SSB) greater than 106,000 tonnes (B_{lim}).
2. Where the SSB is estimated to be above 200,000 tonnes the Parties agreed to restrict their fishing on the basis of a TAC consistent with a fishing mortality rate of no more than 0.30 for appropriate age groups.
3. Where the SSB is estimated to be below 200,000 tonnes but above 106,000 tonnes, the TAC shall not exceed a level which, on the basis of a scientific evaluation by ICES, will result in a fishing mortality rate equal to $0.30 - 0.20 \times (200,000 - \text{SSB}) / 94,000$.
4. Where the SSB is estimated by the ICES to be below the minimum level of SSB of 106,000 tonnes the TAC shall be set at a level corresponding to a fishing mortality rate of no more than 0.1.
5. Where the rules in paragraphs 2 and 3 would lead to a TAC which deviates by more than 15 % from the TAC of the preceding year the Parties shall fix a TAC that is no more than 15 % greater or 15 % less than the TAC of the preceding year.
6. Notwithstanding paragraph 5 the Parties may where considered appropriate reduce the TAC by more than 15 % compared to the TAC of the preceding year.
7. A review of this arrangement shall take place no later than 31 December 2012.
8. This arrangement enters into force on 1 January 2009.”

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the agreed management plan that the landings should be no more than 118 000 t in 2010.

Other considerations:

Exploitation boundaries in relation to existing management plans: At the present SSB level, F should be no more than 0.3 to be in accordance with the management plan. This would give a 24% reduction in the TAC. However, there is a 15% TAC constraint when the stock is above B_{pa} and applying this corresponds to landings of 118 000 t in 2010.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential, and considering ecosystem effects: The current fishing mortality (2006-2008 average) is estimated at 0.29, which is close to the management plan target rate expected to lead to high long-term yields (F = 0.3).

Exploitation boundaries in relation to precautionary limits: An increase of F to 0.39 is possible while keeping SSB above B_{pa} in 2011. This corresponds to landings of less than 132 000 t in 2010.

STECF COMMENTS: STECF agrees with the ICES advice

STECF notes that the most recent (2005) data available on landings by ICES statistical rectangle show that all significant landings come from statistical rectangles west of the ‘west of Scotland management line’, or from rectangles bisected by that line. It is therefore possible that the majority of cod landings from Division VIa in recent years could be from vessels unaffected by cod recovery measures and unrestricted in their catch composition (including vessels targeting saithe). It is important that cod recovery measures include all areas occupied by the depleted stock.

STECF further notes that although saithe is assessed together in area IV and VI, TACs are set separately for areas IV and VI. Saithe in the North Sea are mainly taken in a directed trawl fishery. STECF therefore considers the management advice for saithe in the North Sea to be compatible with the advice for North Sea cod provided the fishery for saithe can be shown to comply with the advice from ICES on fisheries with an incidental catch of cod.

The fishery in Subarea VI consists largely of a directed deep-water fishery operating on the shelf edge but includes a mixed fishery operating on the shelf. Therefore STECF considers the management advice for saithe in area VI must take into account the management adopted for area VI cod (no catch and discards for cod).

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED EU/NORWAY MANAGEMENT PLAN.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed EU/Norway management plan the TAC for 2010 should be set at 118,000 t.

2.8. Whiting (*Merlangius merlangus*), Skagerrak & Kattegat (IIIa)

FISHERIES: The majority of whiting landed from the Skagerrak and Kattegat are taken as by-catch in the small-mesh industrial fisheries. Some are also taken as part of a mixed demersal fishery. As in the North Sea stock, landings decreased in the Skagerrak and Kattegat drastically and were below 2,000 t since 1997. Nominal landings for 2008 were 404 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for whiting in the Skagerrak and Kattegat.

STOCK STATUS: The available information is inadequate to evaluate spawning stock or fishing mortality. It is likely that this stock is linked to the North Sea stock. Survey information (1980-2007) shows a decline in the stock size since 2002 and the stock is now below the average of the time-series (1980-2007).

RECENT MANAGEMENT ADVICE:

The landing data available for this stock give insufficient reason to change the advice from 2008. The advice on this stock for the fishery in 2010 is therefore the same as the advice given in 2008 for the 2009 fishery: “The landings should be less than the recent average (2003–2005) landings of 1,050 t as a precautionary value to restrict the potential for re-expansion of the fishery and misreporting from other regions.”

This advice will be updated in October 2010.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224:

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Whiting in IIIa can be classified under Category 6.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

Category 6 State of the stock is not known; advice on appropriate catch

	2010 TAC	Basis
Category 6	1,050t	Aim to set the TAC according to advice but do not change TAC by more than 15%

2.9. Whiting (*Merlangius merlangus*) in Subarea IV (North Sea) and Division VIId (Eastern Channel)

FISHERIES: Whiting are taken as part of a mixed fishery, as well as a by-catch in fisheries for *Nephrops* and industrial species. Substantial quantities are discarded. Historically total catches have varied considerably ranging between 25,000 and 153,000 t. In 2008, the Working Group estimated that about 26,900 t were caught. The human consumption landings were around 17,900 t with a TAC for 2008 of 17,900 t.

Whiting are caught in mixed demersal roundfish fisheries, fisheries targeting flatfish, the *Nephrops* fisheries, and the Norway pout fishery. The current minimum mesh-size in the targeted demersal roundfish fishery in the northern North Sea has resulted in reduced discards from that sector compared with the historical discard rates. Mortality has increased on younger ages due to increased discarding in the recent year as a result of recent changes in fleet dynamics of *Nephrops* fleets and small mesh fisheries in the southern North Sea. The by-catch

of whiting in the Norway pout and sandeel fisheries is dependent on activity in that fishery, which has recently declined after strong reductions in the fisheries. These are low values based on the assumption of a similar by-catch rate to that observed in previous years, when the industrial fisheries were at a low level. A larger catch allocation for by-catch may be required if industrial effort increases.

Catches of whiting in the North Sea are also likely to be affected by the effort reduction seen in the targeted demersal roundfish and flatfish fisheries, although this will in part be offset by increases in the number of vessels switching to small mesh fisheries.

Recent measures to improve survival of young cod, such as the Scottish Credit Conservation Scheme, and increased uptake of more selective gear in the North Sea and Skagerrak, should be encouraged for whiting.

The minimum mesh size increased to 120 mm in the northern area in 2002 and this may have contributed to the substantial decrease in reported landings. Landings compositions from the northern area, in 2006 and 2007, indicate improved survival of older ages. In addition, the total number of fish discarded appears to have been significantly reduced since 2003, from around 60% in 2003 to around 47% in 2008.

Scotland has implemented a national scheme known as the 'Conservation Credits Scheme'. The principle of this two-part scheme involves additional time at sea in return for the adoption of measures which reduce mortality on cod and lead to a reduction in discard numbers. ICES has not yet been able to evaluate the consequences of these measures. Despite their introduction, ICES notes that during the initial year of operation (2008) cod discarding rates increased substantially.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The stock assessment is based on an XSA assessment, calibrated with two survey indices. Commercial catch-at-age data were disaggregated into human consumption, discards, and industrial by-catch components.

Partial fishing mortalities from these catch components were calculated from their average contribution over 2006–2006. This could not be done on an area basis. Discards were estimated based on data from Scotland, England, Denmark and Germany and raised to the total international fleet in the North Sea. Discard information is now available for the years 2003 to 2008 for a major component of the catch from French fleets fishing in Areas IV and VIIId, these data will be incorporated in next years assessment.

There are considerable discrepancies in stock trends prior to 1990 between the survey time-series and the assessment based on commercial catch data. Calibration data prior to 1990 were therefore omitted from the time-series.

PRECAUTIONARY REFERENCE POINTS:

No precautionary reference points are set for this stock.

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be evaluated. An analytical assessment estimates SSB in 2009 as being near the lowest level since the beginning of the time-series in 1990. Fishing mortality has declined from 2000 - 2004, but increased in recent years. Recruitment has been very low since 2002 with an indication of a modest improvement in the 2007 year-class.

RECENT MANAGEMENT ADVICE:

Because no reference points are available ICES advises on the basis of precautionary considerations that a significant reduction of the TAC is required to remedy the decline in SSB. An immediate TAC reduction of 61% (13,400t total catch, 7,400t human consumption catch) is needed to stabilise the stock, but rebuilding would require a further reduction.

Other considerations:

ICES has developed a generic approach to evaluate whether new survey information that becomes available in September forms a basis to update the advice. If this is the case, ICES will publish new advice in November 2009.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Whiting in Subarea IV and Division VIIId can be classified under Category 6.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.
Category 6 State of the stock is not known; advice on appropriate catch

	2010 TAC	Basis
Category 6	12,920t	State of the stock is unknown, Annex III, rule 5b, 15% TAC constraint

2.10. Anglerfish (*Lophius piscatorius*) in IIa (EU zone), North Sea IV, IIIa

FISHERIES: Anglerfish are taken as a by-catch by towed gears in the Skagerrak (IIIa), Northern North Sea and IIa, with an increasing directed trawl fishery in the deeper areas of the Northern North Sea (where 90% or more of the Area IV landings are taken). The fishery is dominated by the Scottish fleet, which takes around 70% to 90% of the total landings in this area. ICES estimates of landings of anglerfish from the North Sea show a rapid increase in the late 1980s from about 10000 t to about 18000 t (1997) followed by a decrease to between 8,000 t and 9,000 in 2003 and 2004. Provisional official landings for 2008 are given as 11,700 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The stock in the North Sea was formerly treated as a separate assessment unit, but the assessment has since 2004 been combined with that in Sub-Area VI – see Section 2.9.

STECF COMMENTS: ICES considers Anglerfish in Sub-areas IV and VI and Div. IIIa a single stock. For management purposes, anglerfish on the entire Northern Shelf are currently, split into 3 management units: 1) Sub-area VI (including Vb (EC), XII and XIV), 2) the North Sea (including IIIa and the EU waters of IIa), and 3) IIa, Norwegian waters. However, it is noticed by ICES, that anglerfish in IIIa has not been included in the EU management (annual “COUNCIL REGULATIONS the fishing opportunities etc.”). Since there are no national regulations for anglerfish in IIIa STECF **recommends** that IIIa is included in the EU management as well as in the EU-Norway agreement.

2.10.1. Request to STECF on monkfish (*Lophius spp.*)

STECF opinion is requested on possible needs for a minimum landing size on Monkfish in relation to the status of the stock. If such needs are confirmed, STECF will be requested to advice on such a MLS for Monkfish.

STECF response

STECF opinion is requested on possible needs for a minimum landing size on Monkfish in relation to the status of the stock. If such needs are confirmed, STECF will be requested to advise on such a MLS for Monkfish.

STECF notes that the among the 3 stocks of Anglerfish in northern and western divisions (IIIa, IV, Vb(EU), VI, XII and XIV), western divisions (VII and VIII a, b, d, e), and south-western divisions (VIIIc, IX and X) only the status of the latter stocks of *Lophius piscatorius* and *L. budegassa* is assessed. Based on this knowledge, STECF notes that the stock of *L. piscatorius* in the south-western divisions requires stringent conservations measures as it is currently in a poor state.

STECF notes that minimum landings size regulations as stock conservation measure is normally used in conjunction with minimum mesh size regulations and is also intended to discourage the capture of small individuals. However, STECF also notes that fisheries that exploit monkfish are primarily mixed fisheries and that because of their morphology size-selectivity of monkfish by both static and towed gears is poor. In general, even small animals are caught in nets with large meshes. Hence small animals are invariable caught if they are present where fishing operations take place. The only practical measure to safeguard against the capture of small monkfish is to avoid areas where such individuals occur or in the case of towed gears, to use semi-rigid grids, which have been shown to improve size selection (Maartens, *et al*, 2002; Loaec, *et al*, 2006). In the absence of such devices, the most practical method to reduce the exploitation rate on small monkfish is to reduce fishing

effort in areas where small individuals occur. STECF concludes therefore that the introduction of a minimum landing size for monkfish is unlikely to provide significant conservation benefit and that effort restrictions in areas where small monkfish occur, are a more appropriate method to control the exploitation rate on small individuals.

References

- Maartens, L., Gamst, K.A. and Schneider, P.M., 2002. [Size selection and release of juvenile monkfish *Lophius vomerinus* using rigid sorting grids](#). *Fisheries Research*, 57, pp75-88
- Loaec, H, Morandeau, F., Meillat, M. and Davies, P, 2006. [Engineering development of flexible selectivity grids for *Nephrops*](#). *Fisheries Research*, 79, pp 210-218

2.11. Brill (*Scophthalmus rhombus*) in the North Sea

ICES has not assessed this stock and STECF has no access to any stock assessment information on brill in this area.

A precautionary TAC (including turbot) in areas IIa and IV for 2009 was set to 5,263 t.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Brill in the North Sea can be classified under Category 11

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	4474 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

2.12. Dab (*Limanda limanda*) IIa (EU zone), North Sea

ICES has not assessed this stock and STECF has no access to any stock assessment information on dab in this area.

A precautionary TAC (including flounder) in areas IIa and IV for 2009 was set to 18,810 t.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that dab in IIa (EU zone) and the North Sea can be classified under Category 11

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	15989 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

2.13. Flounder (*Platichthys flesus*) - IIa (EU zone), North Sea

ICES has not assessed this stock and STECF has no access to any stock assessment information on flounder in this area.

A precautionary TAC (including dab) in areas IIa and IV for 2009 was set to 18 810 t.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that flounder in IIa (EU zone) and the North Sea can be classified under Category 11

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	15989 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

2.14. Lemon sole (*Microstomus kitt*) in the North Sea

STECF did not have access to any stock assessment information on Lemon sole in this area.

A precautionary TAC (including witch) in areas IIa and IV for 2009 was set to 6,793 t.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that lemon sole in the North Sea can be classified under Category 11

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	5774 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

2.15. Megrim (*Lepidorhombus whiffiagonis*.) in IIa (EU zone), North Sea

Megrim in IIa and IV are assessed together with megrim in Subarea IV. The stock summary and advice is given in Section 2.11.

2.16. Plaice (*Pleuronectes platessa*) in Kattegat and Skagerrak (Division IIIa)

FISHERIES: The plaice catches in this area are taken in fisheries using seine, trawl and gill nets targeting mixed species for human consumption. Plaice is an important by-catch in a mixed cod-plaice fishery. Denmark and Sweden account for the majority of the landings while only minor landings are taken the German, Norwegian and, occasionally, vessels from Belgium and Netherlands. Landings fluctuated between 7,700 and 16,500 t. (1980-1999). Landings in 1998 and 1999 were amongst the lowest around 8,500 t. The landings increased to 11,560 t in 2001 but subsequently decreased and amounted to 6,905 in 2005 and 9,400 in 2006 compared to a TAC of 9,600 t. Landings in 2007 and 2008 are estimated to be 8,800 t and 8,600 t respectively.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: In 2007, ICES identified key issues that would need to be resolved before reaching further improvements in the assessment. The various surveys give a reasonably consistent result for the eastern part of the area. The status of the western part is more uncertain, due to potential mixing with North Sea plaice and limited survey coverage. The landings-at-age matrix does not show proper tracking of the cohorts, probably due to i) mixing of the IIIa stock with the North Sea plaice stock on the main fishing ground in southwestern Skagerrak, and ii) uncertainty in ageing due to low sampling levels.

In 2009, ICES still considered these issues as outstanding, although uncertainty due to age reading is likely to have decreased in the recent years

RECENT MANAGEMENT ADVICE: As in 2008, the new analysis available for this stock has not given a reason to change the advice from 2007. The advice on this stock for the fishery in 2010 is therefore the same as the advice given over the last 2 years: “Landings should not exceed the level recorded in 2006 of 9,400 t.”

This advice will be updated in 2011.

STECF COMMENTS: STECF agrees with the ICES advice.

STECF notes that fisheries for plaice in Division IIIa are linked to those exploiting sole and that this linkage should be taken into account when implementing management rules for either stock.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that plaice in subarea IIIa can be classified under Category 6.

Accordingly STECF notes that the rules for the above category imply the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	9,935 t	State of stock not known precisely and STECF advices on an appropriate catch level, 15% TAC constraint

2.17. Plaice (*Pleuronectes platessa*) in Subarea IV (North Sea)

FISHERIES: North Sea plaice is taken mainly in a mixed flatfish fishery by beam trawlers in the southern and south eastern North Sea. Directed fisheries are also carried out with seine and gill net, and by beam trawlers in the central North Sea. Fleets involved in this fishery are the Netherlands, UK, Belgium, Denmark, France, Germany and Norway. Landings fluctuated between 70,000 and 170,000 t (1987-2002) and are predominantly taken by EU fleets. The 2003, 2004, 2005, 2006 and 2007 landings of 66,500 t, 61,400t 55,700 t, 57,900 t and 49,700 t respectively were the lowest recorded since 1957. Landings in 2008 reached a record low of 48,900 t.

The combination of days-at-sea regulations, high oil prices, and the decreasing TAC for plaice and the relatively stable TAC for sole, appear to have induced a more southern fishing pattern in the North Sea. This concentration of fishing effort results in increased discarding of juvenile plaice that are mainly distributed in those areas. This process could be aggravated by movement of juvenile plaice to deeper waters in recent years where they become more susceptible to the fishery. Also the lpue data show a slower recovery of stock size in the southern regions that may be caused by higher fishing effort in the more coastal regions.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using landings and discards, calibrated with three survey indices.

PRECAUTIONARY REFERENCE POINTS: The assessment for North Sea plaice has been fundamentally changed with the inclusion of discards in the assessment since 2004. Accordingly, the reference points were re-estimated. B_{lim} is set as B_{loss} , (160,000t) the lowest observed biomass in 1997 as assessed in 2004. B_{pa} is based on $1.4*B_{lim}$ and set at 230,000 t. F_{pa} is based on F_{lim} ($=F_{loss}$) and set at 0.6, which is the 5th percentile of F_{loss} (0.74) and gives a 50% probability that SSB is around B_{pa} in the medium term.

MANAGEMENT AGREEMENTS: The management agreement (1999), previously agreed between the EU and Norway was not renewed for 2005 and since that year has not been in force. A multiannual plan for fisheries exploiting stocks of plaice and sole in the North Sea was established on 11 June 2007 (Council Regulation (EC) No 676/2007). This plan has two stages. The first stage aims at an annual reduction of fishing mortality by 10% in relation to the fishing mortality estimated for the preceding year, with a maximum change in TAC of +or- 15% until the precautionary reference points are reached for both plaice and sole in two successive years. ICES has interpreted the F for the preceding year as the estimate of F for the year in which the assessment is carried out. The basis for this F estimate in the preceding year will be a constant application of the procedure used by ICES in 2007. In the second stage, the management plan aims for exploitation at $F = 0.3$.

ICES has evaluated the agreed long-term management plan (Council Regulation (EC) No. 676/2007) for plaice and sole. For plaice, the management plan evaluation is not yet conclusive with regards to consistency with the precautionary approach due to the following shortcomings:

- Lack of robustness to the starting values for population abundance
- Systematic over-estimation of historic landings
- Under-estimation of bias and variance in the assessment model

STOCK STATUS: Based on the most recent estimate of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and as being harvested sustainably. SSB is estimated to have increased above the B_{pa} . Fishing mortality is estimated to have decreased to below F_{pa} and F_{target} . Recruitment has been of average strength from 2005 onwards. The recruitment in 2008 is just below the long-term average.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the existing EU management plan. Although the evaluation of the plan has not been conclusive, the fishing mortality in 2010 when applying the management plan is expected to give benefits in terms of long-term yield and low risk to the stock compared to fishing at precautionary levels. ICES therefore advises to limit landings to 63 825 t for the year 2010.

Other considerations:

Exploitation boundaries in relation to existing management plans: According to the management plan adopted by the EU in 2007, the fishing mortality in 2010 should be at the target $F (= 0.3)$ with the constraint that the change in TAC should not be more than 15%. In this case the 15% limit is the determining factor, resulting in a TAC of no more than 63 825t.

ICES has not yet concluded on the status of the EC management plan in relation to precautionary approach.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: The current total fishing mortality (including discards) is estimated to be 0.25, which is above the rate expected to lead to high long-term yields and low risk of stock depletion (F_{MAX}).

Exploitation boundaries in relation to precautionary limits: The exploitation boundaries in relation to precautionary limits imply human consumption landings of less than 138 000 t in 2010, which is expected to maintain SSB above B_{pa} in 2011, while maintaining F below F_{pa}

STECF COMMENTS:

STECF agrees with the ICES advice and therefore **recommends** that the 2010 TAC for plaice in IV should be set in accordance with the provisions of the management plan.

STECF notes that a major part of the fleet fishing for sole and plaice in the North Sea is reported to have spent less effort in that area in 2009 compared to 2007 and 2008, including the decommissioning of 25 vessels in 2008. The magnitude of the effort reduction in 2009 is not quantifiable at present, but if it results in a reduction in fishing mortality on sole and plaice in 2009, STECF advises that forecasted catches and stock biomass for 2010 are likely to be underestimated.

STECF agrees with ICES that the current minimum landing size results in high discard rates in the mixed flatfish fishery with beam trawls using 80mm mesh size. STECF suggests that technical measures to reduce discarding in addition to an overall reduction in F should be considered

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (Council Regulation (EC) No 676/2007).

STECF notes that for this plan the evaluation was inconclusive with respect to the precautionary approach. However STECF agrees with ICES advice that setting the TAC corresponding to the relevant rule in the management plan is preferable to setting a TAC according to precautionary reference points. Therefore STECF notes that the TAC for 2010 corresponding to the agreed management plan is 63,825t.

2.17.1. Special request on Fishing effort ceilings and Quotas allocated in Sole and Plaice fisheries of the North Sea

Terms of reference

STECF is requested to advice on the maximum level of fishing effort necessary to take catches of the plaice and sole equal to the EU share of the TACs adopted according to the multiannual plan for plaice and sole in the North Sea [R (EC) No 676/2007].

STECF response

STECF observes that similar advice was requested in 2007 for 2008 (see Reports of the STECF plenary June 2007; report 2007 STECF stock review). STECF follows the same approach for the current request. STECF notes that the TAC advice (following the regulation [R (EC) No 676/2007]) given for North Sea sole and plaice respectively implies a reduction of F in 2010 relative to F in 2009 of 10% for sole but of only 2.2% for plaice. Assuming a proportional relationship between fishing mortality and effort in kW*days, and a constant EU share of the TAC for plaice, STECF considers that the best estimate of the maximum level of fishing effort necessary to take catches equal to the EU shares of the TACs, would be equivalent to a reduction in effort in 2010 relative to 2009 of 10% when considering sole in isolation and 2.2% when considering plaice in isolation.

Plaice is mainly caught together with sole in a mixed beam trawl fishery. Therefore, the **maximum** level of fishing effort necessary to take catches of **both species** equal to the respective EU shares of their TACs, would be equivalent to a reduction in effort in 2010 relative to 2009 of 2.2%. STECF notes that this amount of effort would likely lead to a mismatch between effort and the sole TAC adopted according to the flatfish plan [R (EC) No 676/2007], potentially leading to over quota sole catches (under the assumptions of the calculations above the sole TAC would be overshoot by 1 370 tonnes, or 10%). Nevertheless, catching the plaice TAC while avoiding over quota sole catch can possibly be achieved by targeting plaice in the central North Sea where sole is absent or by using 120mm codend mesh size.

STECF also reiterates their note from earlier this year (STECF Review of advice for 2010 Part 1, July 2009), namely that a major part of the fleet fishing for sole and plaice in the North Sea is reported to have spent less effort in that area in 2009 compared to 2007 and 2008, including the decommissioning of 25 vessels in 2008. The magnitude of the effort reduction in 2009 is not quantifiable at present, but if it results in a reduction in fishing mortality on sole and plaice in 2009, STECF advises that forecasted catches and stock biomass for 2010 are likely to be underestimated. This would imply that lower effort levels would be sufficient to catch the respective TACs of both species in 2010.

2.18. Plaice (*Pleuronectes platessa*) in Division VIIId (Eastern English Channel)

FISHERIES: The stock is exploited predominantly in a mixed flatfish fishery by otter and beam trawlers. French offshore otter trawlers have a directed fishery in winter. Countries involved in this fishery are Belgium, France and the UK. Landings fluctuated between 2,000 and 10,000 t (1976-2007). Landings fluctuated hardly in the last decennia but declined slightly in the last 6 years from 5,800 t to 3,500 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.45$, $B_{pa} = 8,000t$.

STOCK STATUS: The assessment is indicative of trends only. The SSB trends suggest that the spawning-stock biomass has declined through the last 15 years to a stable historical low level. The current level of SSB is low. F varies without trend around the long-term average. Recruitment in 2006 and 2007 have been above average.

RECENT MANAGEMENT ADVICE: In the absence of a short-term forecast, ICES advises on the basis of exploitation boundaries in relation to precautionary considerations that landings in 2010 should not increase above the average of landings from the last three years (2006–2008), corresponding to landings less than 3 500 t.

STECF COMMENTS: STECF agrees with the ICES advice for VIId plaice.

STECF notes that plaice in VIId and VIIe are managed by a joint TAC, and that the advice from ICES is radically different for the two stock components. *“No increase above the average of landings from the last three years (2006–2008), corresponding to landings less than 3 500 t”* for plaice in VIId and *“a substantial reduction in catches”* for plaice in VIIe.

STECF notes that following the EU Commission consultation paper on TACs for 2010 (COM (2009) 224, 12 May 2009) this stock would be categorised based on the average of SSB in the last 2 years compared to the average of the 3 preceding years. For this stock only relative measures of stock biomass are available but these show a reduction of 3%, resulting in an unchanged TAC.

STECF reiterates its previous comments:

- i) Due to the minimum mesh size (80 mm) in the mixed beam trawl fishery, a large number of undersized plaice are discarded. Discard estimates are not included in the assessment. The 80-mm mesh size is not matched to the minimum landing size of plaice (27 cm). Measures taken specifically directed at sole fisheries will also impact the plaice fisheries.
- ii) There is some uncertainty about the stock structure. Historical tagging information indicates that there may be significant migration of plaice between ICES divisions VIId, e and IVc.
- iii) Finally, the lack of discard information also adds to the overall uncertainty of the status of the stock since discards are not included in the assessment.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that plaice in subarea VIId can be classified under Category 6.

Accordingly STECF notes that the rules for the above category imply the following option for TACs in 2010.

2010 VIId TAC component		Basis
Category 6	$\leq 3,500 t$	State of stock not known precisely and STECF advices on an appropriate catch level

STECF further notes that the result of applying the rules of Annex II of COM (2009) 224 to both separate components result in a joint TAC for plaice in VIId,e of no greater than $3,500 t + 828 t = 4,328 t$. (See also section 4.14)

2.19. Sole (*Solea solea*) in Division IIIa

FISHERIES: The fishery is mainly conducted by Denmark, with smaller landings taken by Germany and Sweden. Significant amounts of sole are taken as by-catch in the fishery for *Nephrops*. Landings fluctuated between 200 t and 1,400 t (1971-2007). In 2008 landings were 543 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice is based on an age-based assessment using cpue data from three commercial tuning series (reference fleets) and one scientific survey series. During the period 2002–2004 there was considerable misreporting due to limiting TACs and weekly quota, which were included in the assessment. Since mid-2005, the increase in TAC and improved control are believed to have resulted in insignificant misreporting.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.30$, $B_{pa} = 1,060$ t.

STOCK STATUS Based on the most recent estimates of SSB (in 2009) and F (in 2008), ICES classifies the stock as having full reproductive capacity and being harvested sustainably. SSB has decreased since 2005 but is still well above B_{pa} . Fishing mortality has increased from 0.22 in 2007 to 0.28 in 2008. Recruitment has been below average in recent 4 years.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of exploitation boundaries in relation to precautionary limits that fishing mortality in 2010 should be kept below F_{pa} , corresponding to landings of less than 620 t.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that sole in subarea IIIa can be classified under Category 2.

Accordingly STECF notes that the rules for the above category imply the following option for TACs in 2010.

	2010 TAC	Basis
Category 2	680 t	Stock overexploited compared to maximum sustainable yield but inside safe biological limits, 15% TAC constraint

2.20. Sole (*Solea solea*) in Sub-area IV (North Sea)

FISHERIES: Sole is mainly taken by beam trawl fleets in a mixed fishery for sole and plaice in the southern part of the North Sea. A relatively small part of the catch is taken in a directed fishery by gill-netters in coastal areas, mostly in the 2nd quarter of the year. The stock is exploited predominantly by The Netherlands with smaller landings taken by Belgium, Denmark, France, Germany and the UK. Landings have fluctuated between 11,000 and 35,000 t (1957-2007). The landings in 2008 are around 14,100 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.40$, $B_{pa} = 35,000$ t, $B_{lim} = 25,000$ t.

MANAGEMENT AGREEMENTS: A multiannual plan for fisheries exploiting stocks of plaice and sole in the North Sea was established on 11 June 2007 (Council Regulation (EC) No 676/2007). This plan has two stages. The first stage aims at an annual reduction of fishing mortality by 10% in relation to the fishing mortality estimated for the preceding year, with a maximum change in TAC of +or- 15% until the precautionary reference points are reached for both plaice and sole in two successive years. ICES has interpreted the F for the preceding year as the estimate of F for the year in which the assessment is carried out. The basis for this F estimate in the preceding year will be a constant application of the procedure used by ICES in 2007. In the second stage, the management plan aims for exploitation at $F = 0.2$.

ICES has evaluated the agreed long-term management plan (Council Regulation (EC) No. 676/2007) and concluded that it leads on average to a low risk of $B < B_{lim}$ within the next 10 years. ICES conclude that for sole the management plan can be provisionally accepted as precautionary.

STOCK STATUS: Based on the most recent estimate of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and is being harvested sustainably. SSB has fluctuated around the precautionary reference points for the last decade, but has increased since 2008 owing to a large incoming 2005 year-class and reduced fishing mortality. Fishing mortality has shown a declining trend since 1995 and is currently estimated to be below F_{pa} . The assessment suggests that the 2006 year-class was below average, and 2007 average.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the existing EU management plan that landings should be less than 14,100 t in 2010.

Other considerations:

Exploitation boundaries in relation to the agreed management plan: According to the management plan adopted by the EC in 2007, fishing mortality in 2010 should be reduced by 10% compared to the fishing mortality estimated for the preceding year ($F_{2008}=F_{2009}=0.34$) with the constraints that the TAC should not be changed by more than 15%. A 10% reduction in fishing mortality corresponds to an F of 0.304 and landings of 14 100t in 2010 which is within the 15% change ($TAC_{2009}=14\ 000t$). Additional evaluations of the management plan are necessary to take into account retrospective bias of the assessment and the sporadic nature of recruitment.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: The current fishing mortality is within the range that is expected to lead to high long-term yields and low risk to stock depletion.

Exploitation boundaries in relation to precautionary limits: The fishing mortality in 2010 should be no more than F_{pa} , corresponding to landings of less than 17,800 t..

ICES further notes that

- Sole are mainly caught in a mixed beam trawl fishery with plaice and other flatfish using 80-mm mesh in the southern North Sea. The minimum mesh size in the mixed beam trawl fishery in the southern North Sea means that large numbers of undersized plaice and cod are discarded. Measures to reduce discarding in the mixed beam trawl fishery would greatly benefit these stocks. An increase in the minimum landing size of sole could provide an incentive to fish with larger mesh sizes and would therefore mean a reduction in the discarding of plaice. The minimum landing size of North Sea sole is 24 cm. An increased mesh size in the fishery would reduce the catch of undersized plaice and cod, but would also result in short-term loss of marketable sole.
- The peaks in the historical time-series of SSB of North Sea sole correspond with the occasional occurrence of strong year-classes. Due to a high fishing mortality the SSB has declined during the nineties. The fishery opportunities and SSB are now dependent on incoming year-classes and can therefore fluctuate considerably between years. The SSB and landings in recent years have been dominated by the 2001 and 2005 year-classes. The predicted SSB in 2010 is largely dependent on the above-average recruitment of the 2005 year-class.

STECF COMMENTS: STECF agrees with the ICES advice and therefore **recommends** that the 2010 TAC for sole in IV should be set in accordance with the provisions of the management plan.

STECF notes that a major part of the fleet fishing for sole and plaice in the North Sea is reported to have spent less effort in that area in 2009 compared to 2007 and 2008, including the decommissioning of 25 vessels in 2008. The magnitude of the effort reduction in 2009 is not quantifiable at present, but if it results in a reduction in fishing mortality on sole and plaice in 2009, STECF advises that forecasted catches and stock biomass for 2010 are likely to be underestimated.

STECF notes that as sole are mainly caught in a mixed beam trawl fishery, the management measures for sole should take into account management measures adopted for other species especially North Sea plaice and North Sea cod for which stringent management is advised.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (Council Regulation (EC) No 676/2007).

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed management plan the TAC for 2010 should be set at 14,100 t.

2.20.1. Special request on Fishing effort ceilings and Quotas allocated in Sole and Plaice fisheries of the North Sea

The response to the above request is given in Section 2.17.1.

2.21. Sole (*Solea solea*) in Division VIId (Eastern English Channel)

FISHERIES: The main fleets, fishing for sole in Division VIId, are Belgian and English offshore beam trawlers (> 300 HP), which also take plaice as a by-catch. These fleets also operate in other management areas. French offshore trawlers targeting roundfish also take sole as a by-catch. Also numerous inshore < 10 m boats on the English and French coasts target sole in the spring and autumn mainly using fixed nets. Between 1986–1997, the total landings have been fluctuating around 4,500t. In 1998 the lowest landings were observed (3,400t), since 2000 the landings have increased to 5,000t in 2003 and fluctuated around that high value for the next 7 years. Landings in 2008 are slightly lower at 4,500 tonnes. It should be noted that although sometimes official landings were declared according agreed TAC's, it is apparent that since 1997 the uptake was always lower than the TAC.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Although corrected for, the analytical assessments, using catch-at-age and CPUE data from commercial fleets and surveys are considered uncertain due to under-reporting from the inshore fleet and mis-reporting by beam trawlers.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.40$, $B_{pa} = 8,000$ t.

STOCK STATUS: Based on the most recent estimate of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and at risk of being harvested unsustainably. The spawning-stock biomass has been fluctuating around a mean of about 10 000 t since 1982, and has been above B_{pa} since 2002. The fishing mortality has decreased since 1999 and has been around F_{pa} from 2001 until 2005. In the last 3 years fishing mortality has increased and fluctuated between F_{pa} and F_{lim} . The 2001, 2004 and 2005 year-classes were the three highest since 1990. The 2007 year-class is the weakest in the time-series.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of precautionary limits that fishing mortality in 2010 should be no more than F_{pa} corresponding to landings of less than 3,190 t in 2010.

Other considerations:

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential, and considering ecosystem effects: Fishing mortality in 2008 is estimated at 0.45, above the range that would lead to high long-term yields and low risk of stock depletion.

Exploitation boundaries in relation to precautionary limits: The fishing mortality in 2010 should be below F_{pa} corresponding to landings less than 3,190 t in 2010, which is expected to keep SSB above B_{pa} in 2011.

STECF COMMENTS: STECF agrees with the ICES advice for VIId sole.

STECF notes that the 80mm mesh size in the mixed beam trawl fishery is not matched to the minimum landing size of plaice. Measures to reduce plaice discarding in the sole fishery would greatly benefit the plaice stock and future yields. Mesh enlargement would reduce the catch of undersized plaice, but would also result in short-term loss of marketable sole. Furthermore, an increase in the minimum landing size of sole could provide an incentive to fish with larger mesh sizes and therefore mean a reduction in the discarding of plaice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that sole in Division VIIId can be classified under Category 3.

Accordingly STECF notes that the rules for the above category imply the following option for TACs in 2010.

Category 3, Stock outside safe biological limits.

	2010 TAC	Basis
Category 3	3,650 t	Aim to set the TAC to the forecast catch that will result in a 30% reduction in fishing mortality rate, but do not reduce the TAC by more than 20% as long as fishing mortality will not increase. Limiting landings in 2010 3,650 t.

2.22. Turbot (*Psetta maxima*) in the North Sea

ICES has not assessed this stock and STECF has no access to any stock assessment information on turbot in this area.

A precautionary TAC (including brill) in areas IIa and IV for 2009 was set to 5,263 t.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that turbot the North Sea can be classified under Category 11

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	4474 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

2.23. Witch (*Glyptocephalus cynoglossus*) in the North Sea

ICES has not assessed this stock and STECF has no access to any stock assessment information on turbot in this area.

A precautionary TAC (including lemon sole) in areas IIa and IV for 2009 was set to 6,793 t.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that witch in the North Sea can be classified under Category 11

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	5774 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

2.24. Norway pout (*Trisopterus esmarki*) in IIa, IIIa and the North Sea

FISHERIES: The fishery is mainly by Danish and Norwegian vessels using small mesh trawls in the northern North Sea.

The stock is managed by TACs. Landings fluctuated between 110,000 and 735,000 t. in the period 1971-1997, and apart from 2000 (184,000 t) decreased substantially in the following years. The fishery was closed in 2005, reopened in 2006 and closed again in 2007. The agreed TAC for 2008 was 43,500 t. Landings in 2008 were 36,100 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The analytical seasonal XSA assessment model fitted for this stock is based on time-series of catch-at-age, one commercial cpue series, and four research survey series.

MANAGEMENT OBJECTIVES: No management objectives have been set for this stock. Due to the short-lived nature of this species a preliminary TAC is set every year, which is updated on the basis of advice in the first half of the year.

ICES has evaluated and commented on three management strategies, following requests from managers – fixed fishing mortality (0.35), fixed TAC (50 000 t), and a variable TAC escapement strategy. The evaluation shows that all three management strategies are capable of generating stock trends that stay away from Blim with a high probability in the long-term and are therefore considered to be in accordance with the precautionary approach.

PRECAUTIONARY REFERENCE POINTS: No F_{pa} is set for this stock. The proposed $B_{pa} = 150,000t$, $B_{lim} = 90,000$.

STOCK STATUS: The most recent estimates of SSB (Q3 2009) show full reproductive capacity of the stock ($SSB > B_{pa}$). Catches and fishing mortality has been low in 2008 and first half year 2009. Fishing mortality has generally been lower than the natural mortality for this stock and has decreased in recent years well below the long term average F (0.6). Recruitment in 2008 was just below the long term average and in 2009 was above average.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of precautionary limits that in order to maintain the spawning stock biomass above B_{pa} in 2010 catches should be restricted to less than 307,000 t.

Other considerations:

The catch forecast for 2010 assumes status quo fisheries in 2009, with catches of 45 000 t. This is well below the quota for 2009 (157 000 t). In case the quota are fully taken in 2009 this will result in lower catch forecasts for 2010 (226 000 t to reach B_{pa} by 2011).

STECF COMMENTS: STECF agrees with the advice from ICES and the additional considerations.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Norway pout in Subarea IV should be classified as a category 5 stock.

Accordingly STECF notes that the rules for each of the above category imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 5	307 000 t*	Short-lived species

* assuming a catch of 45 000t in 2009

2.25. Sandeel (*Ammodytidae*) in the Skagerrak and Kattegat (IIIa)

The stock summary and advice for Sandeel in IIIa are given together with Sandeel in Subarea IV in Section 2.26.

2.26. Sandeel (*Ammodytidae*) in the North Sea (IV) excluding the Shetland area

Sandeel in the North Sea, the Skagerrak and the Kattegat includes five species. *Ammodytes marinus* is dominating in the North Sea while *Ammodytes tobianus* is relatively more abundant in the Skagerrak and the Kattegat. ICES therefore assess sandeel in the area as three separate stocks, two for the North Sea (Shetland and North Sea excluding the Shetlands) and one for the Skagerrak and the Kattegat. No analytical assessment is available for sandeel in the Skagerrak and the Kattegat.

FISHERIES: Sandeel is taken by trawl with codend mesh sizes of less than 16 mm. The fishery is seasonal, taking place from April to July. Most of the catch in the North Sea consists of *Ammodytes marinus* while *Ammodytes tobianus* constitute a substantial part of the catches in the Skagerrak and the Kattegat. By-catch of other species is low. Sandeels are largely stationary after settlement and the sandeel must be considered as a complex of local populations.

The stocks are exploited predominantly by Denmark and Norway, with minor landings taken by the UK, Sweden, Germany and the Faroes. Landings fluctuated between 550,000 and 1,140,000 t in the period 1980 to 2002 with the highest catches observed in 1997. Catches dropped in 2003 and have since then been well below average reaching a minimum of 172,000 t in 2005. Catches in 2008 amount to 335,200 t. Catch possibilities are largely dependent on the size of the recruiting year-class.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on a seasonal age-based assessment using commercial CPUE data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary biomass reference point for the North Sea stock is $B_{pa} = 600,000t$. No precautionary fishing mortality reference point has been proposed.

STOCK STATUS: According to the most recent estimate of SSB (2009), ICES classifies the stock as being at risk of reduced reproductive capacity. Fishing mortality decreased between 2001 and 2007 and increased in 2008 and 2009, but the present absolute level is uncertain. In the absence of an F reference point, the state of the stock cannot be evaluated with regard to sustainable harvest.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of exploitation boundaries in relation to precautionary limits that fishing grounds that are known to be commercially depleted should be closed to fishing while at non-depleted fishing grounds fishing should only be allowed in 2010 if analysis of real-time monitoring indicates that the stock can be rebuilt to B_{pa} by 2011.

ICES recommends that fishing grounds that are known to be commercially depleted should be closed to fishing until there is evidence from monitoring programs that local populations have recovered. On other fishing grounds, a fishery should only be allowed in 2010 if analysis of monitoring indicates that the stock can be rebuilt to B_{pa} by 2011.

Other considerations:

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential, and considering ecosystem effects: ICES recommended that the management of sandeel fisheries should implement measures to prevent depletion of local aggregations, particularly in areas where predators congregate.

STECF COMMENTS: STECF agrees with ICES advice.

Fishing possibilities are highly dependent on the size of the incoming year-class for which no reliable estimate exists prior to the start of the fishing season. Since 2005, the fisheries have been managed by a precautionary fishing effort ceiling covering a monitoring fishery in the first part of the fishing season, and a final TAC has been set on the basis of the results of the real time monitoring fishery and an agreed harvest rule.

STECF therefore advises that the procedure used by ICES should be applied in 2010 using the revised relationship provided by ICES as follows:

$$TAC_{2010} = -333 + R_{1,2010} * 3.692$$

where $R_{1,2010}$ is the stock size of age-1 sandeel in billions on 1 January 2010 and the TAC is in 1000 tonnes. The estimate $R_{1,2010}$ is derived from the $C_{pue}(\text{age } 1)$ obtained in the RTM fishery.

STECF notes that the above relationship proposed by ICES only applies to the North Sea sandeel excluding the Shetlands, but that the TAC management area includes the whole of the North Sea and Skagerrak and Kattegat as well. Hence, the likely catches of sandeel in the other areas should be taken into account in deriving a TAC for the whole management area. No information is presently available to allow STECF to predict the likely catches in the other areas in 2010. Landings from IIIa and the Shetlands have over the last 20 years constituted 4.43 % of the North Sea landings. STECF suggests that a pragmatic approach would be to use the same percentage to raise the TAC for the North Sea excluding the Shetlands to a TAC for IV and IIIa combined.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that sandeels in Subarea IV and IIIa should be classified as a category 5 stock.

Accordingly STECF notes that the rules for each of the above category imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 5	0 t*	Short-lived species

*unless the real-time monitoring in 2010 can show the population is able to reach Bpa in the presence of fishing.

2.27. Sandeel in Division IVa North of 59°N and West of 0°E (Shetland area)

STECF did not have access to any assessment or advice for sandeel in the Shetland area. ICES reports that the available information is inadequate to evaluate stock trends. The state of the stock is therefore unknown and there is no basis for an advice.

2.28. Rays and skates in the North sea

Previous stock summaries and advice on skates and rays has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice at the level of the North Sea ecoregion. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for skates and rays in the North Sea was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Sections 6.1 and 6.6 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

2.29. Spurdog (*Squalus acanthias*) in the North Sea

Previous stock summaries and advice on spurdog has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice at the level of the North Sea ecoregion. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for spurdog in the North Sea was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Sections 6.1 and 6.2 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

2.30. Other Demersal elasmobranchs in the North sea, Skagerrak and Eastern channel

Previous stock summaries and advice on demersal elasmobranchs has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice at the level of the North Sea ecoregion. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for demersal elasmobranchs was provided by STECF in its consolidated review of advice for 2009 and is reproduced in

Section 6 this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

2.31. Herring (*Clupea harengus*) in the North Sea (Sub-area IV) including components of this stock in Divs. IIa, IIIa and VIIId

Based on the distributions of the spawning grounds, larvae drift, nursery areas and migration of the adults, three main stock units of herring have been defined in the North Sea:

- Buchan herring. Spawn July to September in the Orkney Shetland area and off the Scottish east coast. Nursery areas are along the east coast of Scotland and the Skagerrak and Kattegat.
- Banks herring. Spawn August to September, off English east coast. Historically spawning also took place on the western edge of the Dogger Bank. Nursery areas are off the English east coast and Danish west coast.
- Downs herring. Spawn December to February in the southern North Sea and Eastern Channel. Nursery areas are off the English east coast, Dutch coast, Danish west coast and in the German Bight.

In addition to the three main stock units a number of small spring spawning units exist, spawning in coastal area in the eastern North Sea.

The stock complexity of herring in the North Sea is further complicated by the appearance in the north-eastern North Sea of herring belonging to herring populations spawning in the spring in the western Baltic, Skagerrak and Kattegat. Herring from these populations migrate into the North Sea in summer and autumn.

Although the three main North Sea herring stocks include summer, autumn and winter spawners they are often named autumn spawners to distinguish them from the spring spawning stocks.

FISHERIES: The North Sea autumn spawning herring is exploited by Belgium, Denmark, France, Faroe Islands, Germany, Netherlands, Norway, Sweden, and UK. Four main fisheries exploit the stock:

- Fleet A: Directed herring fisheries with purse-seiners and trawlers (32 mm minimum mesh size) in the North Sea and eastern Channel.
- Fleet B: Herring taken as by-catch in the small-mesh fisheries in the North Sea under EU regulations (mesh size less than 32 mm).
- Fleet C: Directed herring fisheries in Skagerrak and Kattegat with purse-seiners and trawlers (32 mm minimum mesh size).
- Fleet D: By-catches of herring caught in the small-mesh fisheries (mesh size less than 32 mm) in Skagerrak and Kattegat.

At present, the fishery on the stock is managed by five separate TACs in three different management areas (Skagerrak and Kattegat, Northern and Central North Sea, and Southern North Sea and Eastern Channel) through joint arrangements by EU and Norway. For both the North Sea and the Skagerrak and Kattegat two separate TAC's are set, one for each of the four fleets.

Most catch data reported by ICES were official landings, but for some nations catch estimates were corrected by ICES for unallocated and misreported catch. Discard data are either incomplete or entirely missing. ICES catch includes unallocated and misreported landings, discards and slipping. Denmark and Norway provided information on by-catches of herring in the industrial fishery. The catch estimate for the North Sea and eastern Channel in 2008 by ICES amounts to 245,000 t including available estimates of discards. This represents an excess of the 2008 total TAC (220,000 t) of 11%, which is an increase compared to the 2006 and 2007 excess of 3% and 4% respectively. The total amount of catch taken by fleet A has exceeded the human consumption TAC by 17% in 2008 (11% in 2007).

SOURCE OF MANAGEMENT ADVICE: The main advisory body is ICES. The age-based assessment is based on landings from Subarea IV and Division IIIa and VIId and on four survey time series (Acoustic 1–9+ ring index, IBTS age 1–5+, 0-group and larvae SSB indices).

PRECAUTIONARY REFERENCE POINTS: The precautionary reference points for biomass and fishing mortality are $B_{pa} = 1,300,000$ t, $F_{pa} = 0.12$ for age groups 0-1 and $F_{pa} = 0.25$ for age groups 2-6.

STOCK STATUS: Based on the most recent estimates of SSB and fishing mortality, ICES classifies the stock as being at risk of having reduced reproductive capacity and harvested sustainably. The SSB in autumn 2008 was estimated at 1.0 million t, and is expected to remain below B_{pa} (1.3 million t) in 2009. F2-6 in 2008 was estimated at 0.24, above the management target F2-6 (for this state of the stock = 0.14). The year-classes since 2002 are estimated to be among the weakest since the late 1970s.

MANAGEMENT AGREEMENTS:

In November 2008 EU-Norway have agreed on an adjusted management plan taking account of recent poor recruitment. The elements of the plan are as follows:

1. 1. *Every effort shall be made to maintain a minimum level of Spawning Stock Biomass (SSB) greater than 800,000 tonnes (Blim).*
2. 2. *Where the SSB is estimated to be above 1.5 million tonnes the Parties agree to set quotas for the directed fishery and for by-catches in other fisheries, reflecting a fishing mortality rate of no more than 0.25 for 2 ringers and older and no more than 0.05 for 0 - 1 ringers.*
3. 3. *Where the SSB is estimated to be below 1.5 million tonnes but above 800,000 tonnes, the Parties agree to set quotas for the direct fishery and for by-catches in other fisheries, reflecting a fishing mortality rate on 2 ringers and older equal to:*
 5. *$0.25 - (0.15 * (1,500,000 - SSB) / 700,000)$ for 2 ringers and older,*
 6. *and no more than 0.05 for 0 - 1 ringers*
 - 7.
8. 4. *Where the SSB is estimated to be below 800,000 tonnes the Parties agree to set quotas for the directed fishery and for by-catches in other fisheries, reflecting a fishing mortality rate of less than 0.1 for 2 ringers and older and of less than 0.04 for 0-1 ringers.*
9. 5. *Where the rules in paragraphs 2 and 3 would lead to a TAC which deviates by more than 15 % from the TAC of the preceding year the parties shall fix a TAC that is no more than 15 % greater or 15 % less than the TAC of the preceding year.*
10. 6. *Notwithstanding paragraph 5 the Parties may, where considered appropriate, reduce the TAC by more than 15 % compared to the TAC of the preceding year.*
11. 7. *By-catches of herring may only be landed in ports where adequate sampling schemes to effectively monitor the landings have been set up. All catches landed shall be deducted from the respective quotas set, and the fisheries shall be stopped immediately in the event that the quotas are exhausted.*
12. 8. *The allocation of the TAC for the directed fishery for herring shall be 29 % to Norway and 71 % to the Community. The by-catch quota for herring shall be allocated to the Community.*
13. 9. *A review of this arrangement shall take place no later than 31 December 2011.*
14. 10. *This arrangement enters into force on 1 January 2009.*

ICES has evaluated this management plan (WKHMP ICES CM 2008 ACOM:27) and concluded that the plan is consistent with the precautionary approach.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the agreed EU–Norway management plan. Following the agreed management plan implies catches of 164 300 t for fleet A and 10 400 t for fleet B in 2010.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED EU AND NORWAY MANAGEMENT PLAN.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed EU and Norway management plan implying catches of 164 300 t for fleet A and 10 400 t for fleet B in 2010.

2.32. Herring (*Clupea harengus*) in Divisions IVc and VIId (Downs spring-spawning herring)

FISHERIES: The Downs herring constitutes one of the three main stock units forming the North Sea autumn spawning herring stock and is included in Section 1.30.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Assessment has only been made on the combined North Sea stock based on analysis of catch at age data calibrated with survey data. No separate assessment has recently been made for the Downs component of the stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been defined for Downs herring. The precautionary reference points for North Sea autumn spawning herring are $B_{pa} = 1,300,000$ t, $F_{pa} = 0.12$ for ages 0-1 and $F_{pa} = 0.25$ for ages 2-6 (c.f. Sect. 2.30).

STOCK STATUS: The stock has returned to its pre-collapsed state and is now again a major component of the stock.

RECENT MANAGEMENT ADVICE: See the Section 1.30 on herring in the North Sea and adjacent areas. Since 2003 the TAC for Downs herring has averaged 11% of the total TAC for fleet A. This is based on the average share from 1989 – 2002. In the absence of any additional data ICES proposes that a share of 11% of the total North Sea TAC would still be appropriate for Downs herring.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED EU AND NORWAY MANAGEMENT PLAN:

STECF notes that if a TAC for IVc and VIId for 2010 is set according to the ICES advice, the TAC for IVc and VIId should be equal to 11% of the TAC for fleet A which under the agreed management plan corresponds to 18,073 t.

2.33. Horse mackerel (*Trachurus trachurus*) in the North Sea (Divisions IIIa eastern part, IVbc, VIId).

FISHERY: Catches taken in Divisions IVb,c and VIId are regarded as belonging to the North Sea horse mackerel and in some years also catches from Division IIIa - except the western part of Skagerrak. The total catch taken from this stock in 2008 was 34,749 tonnes. In previous years most of the catches from the North Sea stock were taken as a by-catch in the small mesh industrial fisheries in the fourth quarter carried out mainly in Divisions IVb and VIId, but in recent years a large part of the catch was taken in a directed horse mackerel fishery for human consumption.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are set for this stock, as there is insufficient information to estimate reference points.

STOCK STATUS: The available information is inadequate to evaluate spawning stock or fishing mortality relative to risk, so the state of the stock is unknown. Catches increased rapidly in late 1990s and have remained high since.

RECENT MANAGEMENT ADVICE: ICES reiterates the recommendation made since 2002 to limit the catches to below the 1982-1997 average of 18 000 t. It is necessary to constrain the fishery until there is more information about the structure of horse mackerel stocks, and sufficient information to show that higher exploitation rates are sustainable. Most of the catch of North Sea horse mackerel is taken in ICES Division VIId (90% in 2008). It is a key problem that the TAC for the western stock is allocated to this ICES division, but catches from this area are of North Sea horse mackerel.

- The current management units are incompatible with the stock units. The advice for horse mackerel assumes that all catches are counted against the TAC for each stock separately. In 2008 and before, the TAC covered only part of the distribution and fishing areas (EU waters). ICES advises that the management areas correspond to the distribution areas which include all EU, Norwegian, and Faroes waters where horse mackerel are caught. ICES further advises: The TAC for western horse mackerel should apply to all areas where western horse mackerel is caught (EU, Norwegian, and Faroes waters) and where necessary be subject to agreement.

- Catches from ICES Division VIIId should be taken against a TAC for the North Sea stock.

- Catches taken in Division VIIIC need to be taken against a TAC for the western stock.

A directed juvenile fishery occurs in all three horse mackerel stocks, and measures should be taken to ensure that misreporting of juvenile catch taken in Divisions VIIe,h and VIIId (the latter then belonging to the North Sea stock management area) is effectively hindered.

In June 2009, an agreement was concluded between contracting parties to the Coastal States on mackerel banning highgrading, discarding, and slipping from pelagic fisheries targeting mackerel, horse mackerel, and herring beginning in January 2010.

STECF COMMENTS: STECF agrees with the advice from ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM(2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM(2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Horse Mackerel Division IIIa (eastern part), Subarea IV and Division VIIId can be classified under Category 6.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

Category 6 State of the stock is not known; advice on appropriate catch

	2010 TAC	Basis
Category 6	33,413 t	State of the stock is unknown, Annex III, rule 1, -15% TAC constraint

2.34. Mackerel (*Scomber scombrus*) – in the North Sea

The stock summary and advice for mackerel in the North Sea is given in Section 6.6 (Combined Southern, Western and North Sea spawning components).

2.35. Sprat (*Sprattus sprattus*) in ICES Division IIIa

FISHERIES: The fisheries in IIIa are carried out by Denmark and Sweden using trawlers and along the Swedish coast by small purse seiners. Landings of sprat in Division IIIa averaged about 70,000 t in the 1970s, but since 1982 have typically been around 20,000 t, with the exception of 1994–1995 when the ACFM catches were 96,000 t and 56,000 t respectively. Landings in the last ten years have been below 30,000 t, except for 2005 when 40,000 t were reported. Catches have declined since then. ICES estimates the catch in 2008 to be 9,000 t. The directed human consumption sprat fishery serves a very small market while most sprat catches are taken in an industrial fishery, where catches are limited by herring by-catch restrictions. This combination of factors has prevented full utilisation of the occasional strong year-classes (which, in general, emerge and disappear very quickly).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for sprat in Division IIIa.

STOCK STATUS: The available information is inadequate to evaluate stock trends and therefore the state of the stock is unknown. Sprat in this area is short-lived with large annual natural fluctuations in stock biomass.

MANAGEMENT OBJECTIVES: There are no explicit management objectives for this stock. ICES considers that sprat cannot be fished without by-catches of herring except in years with high sprat abundance or low herring recruitment. As sprat in Division IIIa is mainly fished together with juvenile herring, the exploitation of sprat is limited by the restrictions imposed on fisheries for juvenile herring.

RECENT MANAGEMENT ADVICE:

The advice on this stock for the fishery in 2010 is therefore the same as the advice given in 2008 for the 2009 fishery: “Sprat in Division IIIa is mainly fished together with juvenile herring and the exploitation of sprat is limited by the restrictions imposed on fisheries for juvenile herring”

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that sprat in Division IIIa should be classified as a category 5 stock.

STECF notes that an ICES workshop on shortlived species (WKSHORT) took place in September 2009, but the results are not yet available.

2.36. Sprat (*Sprattus sprattus*) in the North Sea (Subarea IV)

FISHERIES: Denmark, Norway and UK exploit the sprat in this area. The fishery is carried out using trawlers and purse seiners. There are considerable fluctuations in total landings, from a peak in 1975 of 641,000 t to a low in 1986 of around 20,000 t. Since 1994, landings have varied from a high, in 1994, of 320,000t to a low, in 1997, of 103,400t. In the last 10 years landings have been below 200,000 t. Estimated total landings in 2007 and 2008 were around 83,800 t, and 61,000 t respectively, the lowest values in the entire time series.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on indicators derived from a research survey and on a two-stage Catch-Survey Analysis (CSA). The CSA model assumes that the population consists of two stages: the recruits and the fully recruited ages. Uncertainties in both the assessment method and the survey indices make the current understanding of this stock extremely poor. Detailed study of improved or alternative assessment methods (e.g. length-based assessment) and the use of additional information sources (e.g. acoustic surveys, catch per unit effort) are required in order improve our level of understanding and ability to adequately manage this stock.

MANAGEMENT OBJECTIVES: There are no explicit management objectives for this stock

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: The state of the stock is uncertain. Survey trends indicate the stock size has increased from the 1980s and varied around an average level since 1998 with no trend.

RECENT MANAGEMENT ADVICE:

ICES notes that there is no evidence recent catches have created problems for the stock. There is no basis for specific numerical advice for the TAC in 2009.

The sprat stock in the North Sea is dominated by young fish. The stock size is mostly driven by the recruiting year-class. Thus, the fishery in a given year will be dependent on that year's incoming year. In the forecast table for North Sea herring, industrial fisheries are allocated a by-catch of approx 10 000 t of juvenile herring in 2010. It is important to continue monitoring of by-catch of juvenile herring to ensure compliance with this allocation. Catches in recent years have been well below the advised and agreed TAC and have decreased because of economic and other reasons.

STECF COMMENTS: Noting that because of the current recruitment problems for North Sea herring, STECF **recommends** that the by-catch quota for herring taken in fisheries conducted with fishing gears with mesh sizes below 32 mm in the North Sea should be significantly reduced.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that sprat in the North Sea should be classified as a category 5 stock.

STECF notes that an ICES benchmark assessment for North Sea sprat took place in September 2009 (WKSHORT), but the results are not yet available.

3. Resources West of Scotland and West of Ireland

3.1. Norway lobster (*Nephrops norvegicus*) in ICES Div. Vb and Sub-area VI, (West of Scotland)

There are no exploited *Nephrops* stocks in Div. Vb. In Sub-area VI (waters west of Scotland) the following functional units are considered by ICES:

FU no.	Name	ICES Divisions	Statistical rectangles
11	North Minch	VIa	44–46 E3-E4
12	South Minch	VIa	41–43 E2-E4
13	Clyde	VIa	39–40 E4-E5

Nephrops also occur in other areas not contained within the Functional Units. TV surveys in deep water suggest widespread distribution at low density, and surveys at Stanton Bank indicate a population there. The three *Nephrops* stocks (FUs) in Sub-area VI are currently assessed from UWTV surveys. On basis of these, current stock abundance and harvest ratios are estimated. The HRs advised by ICES aim at exploitation rates between $F_{0.1}$ and F_{MAX} according to the options/decision rules given in the table:

F relative to $F_{0.1}$ and F_{MAX}	SSB Stable or Increasing	SSB Decreasing
$F > F_{MAX}$	Reduce F to F_{MAX}	Reduce F to $F_{0.1}$
$F_{MAX} > F > F_{0.1}$	Maintain current F	Reduce F to $F_{0.1}$
$F < F_{0.1}$	Increase F to $F_{0.1}$	Maintain current F

STECF considers that it is premature to use the decision rules advocated by ICES as a basis for setting fishing opportunities without a proper evaluation of the likely outcome of such a rule. In view of this, STECF **recommends** that the decision rules advocated by ICES should not form the basis of setting fishing opportunities for 2010 for those *Nephrops* FUs to which it has been applied. The rationale behind this recommendation is given in Section 1.1 of this report.

A summary of the TAC advice for 2010 for the three Functional Units in VIa, is as follows: North Minch (FU11) 972 t, South Minch (FU12) = 4126 t and Firth of Clyde (FU13) 3855 t. STECF notes that there also are *Nephrops* catches in “other rectangles” in Division VIa, e.g. from offshore areas adjacent to Stanton Bank where Irish fishers frequently operate from the shelf edge. To provide some guidance on appropriate future landings for these areas, the use of an average landings figure of around 250 tonnes could be considered.

3.1.1. Norway lobster (*Nephrops norvegicus*) in North Minch (FU 11)

FISHERY: Total *Nephrops* landings increased in the recent years, from about 3,000 t in 2005 to around 3800 t in 2007 (provisional). Available information indicates that landings from the late 1990s up to 2005 are most likely

to be an underestimate of actual landings, but the reliability of landings figures has improved since 2006 with the introduction of buyers and sellers legislation. The *Nephrops* trawl fishery in this area takes by-catches of other species, especially haddock and whiting, anglerfish. Creel fishing takes place mainly in the sea-loch areas of this FU accounting for 600-700 tonnes. Overall effort in creel numbers is not known.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based UWTV surveys of absolute abundance. Previous years' estimates of absolute estimate of abundance from UWTV were considered uncertain because of too high levels of unquantifiable bias. However at the ICES Benchmark Workshop on *Nephrops* in 2009 major sources of bias were quantified for each survey and an overall bias correction factor derived which, when applied to the estimates of abundance from the UWTV survey, allows them to be treated as absolute abundance levels.

PRECAUTIONARY REFERENCE POINTS: No biological reference points have been determined for this stock. No biological reference points have been determined for this stock of *Nephrops*, instead, as mentioned in the introduction, F_{MAX} and $F_{0.1}$ are used as reference points.

Reference points

<i>F</i> reference point	<i>Harvest</i> ratio
$F_{0.1}$	8.8%
F_{MAX}	15.4%

STOCK STATUS: The stock is being exploited unsustainably. The UWTV survey indicates that the population has declined by around 40% over the past two years from a previous time series high in 2006. Harvest ratios in this period were above the values associated with high long-term yield and low risk of stock depletion. Estimated HR indicate that $F(2008)$ is above F_{MAX} .

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to high long-term yield and low risk of depletion of production potential that the Harvest Rate for *Nephrops* fisheries should be less than $F_{0.1}$. This corresponds to landings less than 972 t for the North Minch stock.

STECF COMMENTS: STECF agrees with ICES advice. It is noticed how this year's assessment, based on UWTV survey data, apparently has changed the perception of the status of this stock in 2008. Prior to 2007, the survey and all other information showed this stock to be stable or increasing. The large reduction in survey abundance in 2007 has changed this perception. ICES comments that for this FU, the advice for 2010 implies a large reduction in landings, i.e. a reduction of around 70% compared to 2008 landings. To move toward a fishing mortality corresponding to MSY in steps, a reduction of the catch corresponding to F_{MAX} could be considered as an intermediate step toward $F_{0.1}$. However, adhering to a 'category 2 stock' action plan, a constraint on the year to year change in TAC over several years, as is typical of management plans, would be a feasible alternative.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in North Minch (FU 11) can be classified under Category 6. Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

2010 TAC	Basis
Category 6*	NE No TAC set for separate functional units.

*STECF notes that the predicted catch for 2010 corresponding to a fishing mortality rate of $F_{0.1}$ for FU 11 is 972 t. The stock is overexploited compared to MSY. Safe biological limits have not been established.

3.1.2. Norway lobster (*Nephrops norvegicus*) in South Minch (FU 12)

FISHERY: Total *Nephrops* landings from this FU have been around 4400 t in the two most recent years. Available information indicates that landings from the late 1990s up to 2005 are most likely to be underestimates of actual landings. The reliability of landings figures improved from 2006 with the introduction of buyers and sellers legislation. The *Nephrops* trawl fishery in this area takes by-catches of other species, especially haddock, whiting, anglerfish and megrim. Larger vessels operating on the western limits of the ground generally take higher by-catches of fish. Creel fishing takes place mainly in the sea-loch areas of this FU accounting for around 900 tonnes. Overall effort in creel numbers is not known.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based UWTV surveys of absolute abundance. Previous years' estimates of absolute estimate of abundance from UWTV were considered uncertain because of too high levels of unquantifiable bias. However at the ICES Benchmark Workshop on *Nephrops* in 2009 major sources of bias were quantified for each survey and an overall bias correction factor derived which, when applied to the estimates of abundance from the UWTV survey, allows them to be treated as absolute abundance levels.

PRECAUTIONARY REFERENCE POINTS: No biological reference points have been determined for this stock of *Nephrops*. Instead, as mentioned in the introduction, F_{MAX} and $F_{0.1}$ are used as reference points

Reference points

<i>F</i> reference point	Harvest ratio
$F_{0.1}$	9.6%
F_{MAX}	16.0%

STOCK STATUS: The UWTV survey indicates that the population has declined from record high in 2004 to record low in 2007 but has increased in 2008. Harvest ratios since 2006 have been above $F_{0.1}$, but below F_{MAX} .

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to high long-term yield and low risk of depletion of production potential that the Harvest Rate for *Nephrops* fisheries should not exceed $F(2008)$. This corresponds to landings of no more than 4126 t for the South Minch stock.

STECF COMMENTS: STECF disagrees with the ICES advice since it is based on the TAC decision rule adopted by ICES. STECF considers that a harvest rate corresponding to $F_{0.1}$ as a proxy for F_{MSY} should be the long-term target and that the short term aim should be to adjust the harvest rate towards that target..

STECF agrees with the ICES comment on the change of perception of this FU due to the large reduction in survey abundance in 2007: Prior to 2007, surveys and all other information showed this stock to be stable or increasing. Therefore, given that such a large reduction in abundance is possible with little apparent change in effort a more precautionary management approach is prudent.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in South Minch (FU 12) can be classified under Category 6

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

2010 TAC	Basis
Category 6*	NE No TAC set for separate functional units.

*STECF notes that the predicted catch for 2010 corresponding to a fishing mortality rate of $F(2008)$ for FU 12 is 4126 t. The stock is overexploited compared to MSY. Safe biological limits have not been established.

3.1.3. Norway lobster (*Nephrops norvegicus*) in Firth of Clyde (FU 13)

FISHERY: Total *Nephrops* landings increased in the recent years, from around 3,400 t in 2005 to around 6000 t in 2007, but landings decreased to 5300 t in 2008. Available information indicates that landings from the late 1990s up to 2005 most likely are underestimates of actual landings, but the reliability of landings figures has improved from 2006 with the introduction of buyers and sellers legislation. The *Nephrops* trawl fishery in this area takes by-catches of other species, mainly haddock, whiting and some cod. Creel fishing takes place in parts of this FU accounting for about 200 tonnes. Overall effort in creel numbers is not known.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based UWTV surveys of absolute abundance. Previous years' estimates of absolute estimate of abundance from UWTV were considered uncertain because of too high levels of unquantifiable bias. However at the ICES Benchmark Workshop on *Nephrops* in 2009 major sources of bias were quantified for each survey and an overall bias correction factor derived which, when applied to the estimates of abundance from the UWTV survey, allows them to be treated as absolute abundance levels.

PRECAUTIONARY REFERENCE POINTS: No biological reference points have been determined for this stock of *Nephrops*. Instead, as mentioned in the introduction, F_{MAX} and $F_{0.1}$ are used as reference points

Reference points

<i>F</i> reference point	Harvest ratio
$F_{0.1}$	8.7%
F_{MAX}	15.1%

STOCK STATUS: The UWTV survey indicates that the population has been at a relatively high level since 2003 except for 2007. The stock is being exploited unsustainably. The current harvest rate is well above F_{MAX} .

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to high long-term yield and low risk of depletion of production potential that the Harvest Rate for *Nephrops* fisheries should not exceed F_{MAX} . This corresponds to landings of no more than 3 855 t for the Firth of Clyde stock.

STECF COMMENTS: STECF disagrees with the ICES advice since it is based on the TAC decision rule adopted by ICES. STECF considers that a harvest rate corresponding to $F_{0.1}$ as a proxy for F_{MSY} should be the long-term target and that the short term aim should be to adjust the harvest rate towards that target.

For this FU, this advice implies a large reduction in catch, a situation similar to that for FU 11. The 2009 assessment has changed the perception of this FU due to the large reduction in survey abundance in 2007: Prior to 2007, surveys and all other information showed this stock to be stable or increasing. STECF agrees with ICES that given that such a large reduction in abundance is possible with little apparent change in effort a more precautionary management approach is prudent.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in Firth of Clyde (FU 13) can be classified under Category 6

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

2010 TAC	Basis
Category 6*	NE No TAC set for separate functional units.

*STECF notes that the predicted catch for 2010 corresponding to a fishing mortality rate of F_{MAX} for FU 13 is 3855 t. The stock is overexploited compared to MSY. Safe biological limits have not been established.

3.1.4. Norway lobster (*Nephrops norvegicus*) in FU 16, Porcupine Bank, Divisions VIIb,c,j,k

FISHERIES: Reported total landings for this FU decreased drastically from 2003 t in 2007 to only 861 in 2008. even there are concerns about the accuracy of the landings statistics from some fleets. Landings, effort and LPUEs in this fishery indicate increased targeting of *Nephrops* over the last two years by all countries involved in the fishery.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Analytical assessments are not feasible at present.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been established for this FU.

STOCK STATUS: The state of the stock is uncertain. Effort, landings and size distribution indicate that exploitation rate has been high in the last 5 years. Fishery independent survey information indicates that recruitment has been very weak since 2004 and that the stock has declined to a low level.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to precautionary considerations that catches in 2010 should be reduced to the lowest possible level.

STECF COMMENTS: STECF agrees with the advice from ICES based on currently available data. STECF notes that in the past, this functional unit supported a larger fishery sustained over a considerable period and that a reduction in the fishery coincided with reduced activity by Spain and France. STECF agrees with ICES' concern that the productivity of deep water *Nephrops* stocks is generally lower than those on the shelf although individual *Nephrops* grow to relatively large sizes and attain high market prices. Other deep water *Nephrops* stocks off the Spanish and Portuguese coast have collapsed and have been subject to recovery measures for several years. STECF also notes concerns expressed by ICES about the accuracy of fishery data for some fleets and concludes that improvements are required in order to increase confidence in the assessment.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in Porcupine Bank (FU 16) may be classified under Category 9.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

Category 10 STECF advises a zero catch, a reduction to the lowest possible level or similar advice.

2010 TAC	Basis
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Category 10	NE*	Advice for lowest possible level.
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* NE- not estimable

STECF notes that the advised catch for 2010 should be at the lowest possible level (= 0 t).

3.1.5. Norway lobster (*Nephrops norvegicus*) in FU17, Aran Grounds (Division VIIb)

FISHERIES: Reported landings from this FU were around 1000 t in 2007 and 2008. In the Aran Grounds the most recent change in the fishery is the proportion of twin-rig vessels, which has increased to over 90 % of the fleet in the past eight years. This implies a large increase in effective effort, even if such an increase is not observed in the nominal effort figures.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on an UWTV surveys. However, the corresponding length composition data are insufficient to base estimates of stock specific F reference point on. The use of reference points from other, similar stocks increases the uncertainties.

PRECAUTIONARY REFERENCE POINTS: There are no precautionary reference points for this FU. $F_{0.1}$ for similar stocks ranges between 8% and 12%. F_{MAX} for similar stocks ranges between 13% and 20%

STOCK STATUS: The UWTV survey conducted since 2002 estimates abundance to have fluctuated widely with a peak in 2004. The 2008 survey is the lowest in the series and the 2009 abundance is 51% of the abundance of the maximum observed in 2004. Based on estimates of $F_{0.1}$ and F_{MAX} from other *Nephrops* stocks this stock may be overfished.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to high long-term yield and low risk of depletion of production potential that the Harvest Ratio for *Nephrops* fisheries should be less than the lower bound of $F_{0.1}$ ranges for similar stocks (8%). This corresponds to landings of no more than 704 t for the Aran Grounds stock.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that prior to 2007 landings by some fleets probably have been underreported. The implementation of “sales notes” in Ireland in 2007, coupled with the increased TAC in 2007, have probably improved the reliability of reported landings data. STECF further notes, that the advised landings for 2010 imply a reduction of 36% relative to the 2008 landings (1100 t). To move toward a fishing mortality corresponding to MSY in steps, a reduction of the catch corresponding to the higher boundaries of $F_{0.1}$ could be considered as an intermediate step toward the lower boundaries of $F_{0.1}$ (as a proxy for F_{msy}). Alternatively, a constraint on the year-to-year change in catches as is typical of management plans might be considered.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in Aran Grounds (FU 17) may be classified under Category 6

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

2010 TAC	Basis
Category 6	NE* State of stock not known precisely.

* NE- not estimable

STECF notes that the advised catch for 2010 should not exceed 704 t

3.2. Cod (*Gadus morhua*) in Division VIa (West of Scotland)

FISHERIES: Cod is taken in mixed demersal fisheries and in Division VIa is now regarded as a by-catch species. The fleets involved include French vessels targeting saithe and Scottish whitefish trawlers. Landings are predominantly taken by EU fleets and were sustained at about 21,000 t until the late 1980s. Landings have since declined markedly to a value of about 440 t in 2008. Landings restrictions in the first half of the 1990s led to considerable misreporting. Legislation introduced in Britain and Ireland in 2006 has reduced misreporting. Observer data, however, show an increase in discards starting in 2006. The management area for this stock also includes cod in VIb, Vb, XII and XIV with a specified share allocated to VIa.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. A catch-at-age model using catch data up to 1994 tuned by survey data and utilizing survey information alone from 1995 onward was used to evaluate trends in spawning-stock biomass and recruitment. Trends in SSB are similar to results from a model based on survey data alone.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points are $F_{pa} = 0.6$ and $B_{pa} = 22,000$ t.

STOCK STATUS: The spawning stock biomass has increased from an all time low in 2006 but remains well below Blim. Total mortality is high, but cannot be accurately partitioned into fishing mortality and natural mortality. Recruitment has been estimated to be low over the last decade. The 2005 year-class is estimated to be the largest for that decade, but still below the long-term average.

MANAGEMENT OBJECTIVES:

The EU has adopted a long-term plan for cod stocks and the fisheries exploiting those stocks (Council Regulation (EC) 1342/2008). This regulation repeals the recovery plans in Regulation (EC) No 423/2004, and

has the objective of ensuring the sustainable exploitation of the cod stocks on the basis of maximum sustainable yield while maintaining a target fishing mortality of 0.4 on specified age groups. The regulation is complemented by a system of fishing effort limitation (see EC 43/2009 for latest revision).

Because it is not possible at present to assess unaccounted mortality accurately, ICES cannot yet evaluate if the management plan is in accordance with the precautionary approach.

RECENT MANAGEMENT ADVICE:

ICES evaluated the long-term management plan and has not yet been able to confirm that it is precautionary. Considering the options below, ICES advises on the basis of exploitation boundaries in relation to precautionary considerations that no fishing should take place on cod in Division VIa.

Other considerations:

Exploitation boundaries in relation to existing management plans:

Due to the uncertainty in the level of fishing mortality, ICES is not in a position to give quantitative forecasts. Given the stock status it is likely that the stock will fall into the category defined in Article 9.a of the plan which implies a 25% TAC reduction.

Exploitation boundaries in relation to precautionary limits:

Given the low SSB and low recruitments in recent years, it is not possible to identify any non-zero catch, which would be compatible with the precautionary approach.

STECF COMMENTS: STECF agrees with the ICES advice that on the basis of exploitation boundaries in relation to precautionary considerations, there should be no fishing on Cod in Division VIa.

STECF notes that this stock is subject to the provisions of the long-term management plan for cod (Council Regulation (EC) 1342/2008). Since STECF is unable to derive reliable estimates of fishing mortality for this stock and is therefore unable to provide a quantitative catch forecast, the TAC for 2010 should be set according to Article 9. Furthermore since the advice is for no fishing, Article 9a applies.

At its cod recovery review subgroup (SGRST 07-02), STECF pointed out that changes in fishing behaviour following reductions in days at sea allocations (such as greater concentration in cod rich areas) may prevent delivery of the required reduction in F and that if managers wished to implement effort reductions through reduced days at sea allocations, additional supportive measures might also need to be considered. STECF notes that cod avoidance measures implemented by UK (Scotland) under its Conservation Credits scheme came into operation in 2008. The scheme has continued in 2009 in response to article 13.2 of the cod long-term management plan (Council Regulation (EC) 1342/2008) which allows “*Allocation of additional fishing effort for highly selective gear and cod-avoiding fishing trips*” STECF further notes the difficulty in assessing the effectiveness of either effort reductions or cod avoidance schemes when overall cod mortality can not be reliably partitioned into natural and fishing mortality.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (Council Regulation (EC) 1342/2008).

STECF notes that for this plan as applied to cod in VIa an evaluation was inconclusive with respect to the precautionary approach. STECF therefore notes that the TAC corresponding to the relevant rule in the management plan is 227 t for cod in Division VIa and Vb₁.

3.3. Cod (*Gadus morhua*) in Division VIb (Rockall)

FISHERIES: Rockall cod has been exploited predominantly by Scottish, Irish and Norwegian vessels using towed gears. Landings have fluctuated between 500 t and 2,000 t (1984-2000) but thereafter showed a steady decline to a level of about 60 t from 2005. In 2008 landings increased to just over 90 t. The management area for this stock also includes cod in VIa, Vb, XII and XIV.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES but no explicit management advice is given for this stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are defined for this stock.

STOCK STATUS: There is no information on the status of cod in Division VIb.

RECENT MANAGEMENT ADVICE: No advice has been given.

STECF COMMENTS: Because cod are taken in a mixed fishery with haddock, management measures adopted for VIb cod should also be consistent with the management measures adopted for VIb haddock.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

Given this stock has received no assessment and no advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that cod in VIb can be classified under Category 11.

However, because cod in VIb is included in a TAC set for Vb₁, VI, XII₁, XII₂ and XIV₁ and XIV₂ it is not possible to apply the associated rule for this category to calculate an implied TAC for cod in VIb for 2010.

3.4. Haddock (*Melanogrammus aeglefinus*) in Division VIa (West of Scotland)

FISHERIES: Haddock to the West of Scotland are taken as part of a mixed demersal fishery, with the biggest landings reported by UK (mainly Scottish) trawlers (1,769 tonnes in 2008 representing 64% of the landings); Irish trawlers (879 tonnes in 2008 representing 32% of the landings); and with smaller landings reported by other nations including France, Germany and Norway. Landings by non-EU fleets have not exceeded 100 tonnes over the reported period (1988 – 2008).

In 2006, landings of 5,700 tonnes were reported for this stock, representing an 80% increase on the (previous) record low landings of 3,148 tonnes reported in 2005. Since then reported landings have once again fallen to 3,700 tonnes and 2,800 tonnes in 2007 and 2008 respectively. The 2008 reported landings (9,895 tonnes) are the lowest on record.

It is noteworthy that substantial quantities are discarded when strong year-classes enter this fishery. This is reflected in the estimated catches over the same period, 2005 – 2008, which were 23,628 tonnes, 18,240 tonnes, 11,556 tonnes, and 9,895 tonnes respectively. The 2008 estimated catch of 9,895 is the lowest on record.

Recruitment to this stock has varied greatly over the entire time series. Between 1978 and 2008 it varied from a high of >500 million in 2000 (the 1999 year-class) to a low of some 6.6 million in 2008. The very strong 1999 year-class caused SSB to increase from a level near the historic low in 2000 (24,932 tonnes) to a peak in 2003, although SSB has declined since that time. In recent years recruitment has shown a general and dramatic decline from 2000 (the largest on record) to an estimated recruitment of 6.6 million in 2008 (the lowest on record). Recruitment estimates for 2009 (2008 year-class) are 29.6 million.

Haddock in Division VIa are mainly caught by trawlers, however these fisheries have declined recently with increasing focus on the corresponding Division VIb (Rockall) fishery and the neighbouring *Nephrops* fishery in Division IVa. There has also been a shift from twin trawls to single trawls, and an increase in the use of pair trawls and seines. These changes have been driven by a combination of increased fuel costs during 2008 (driving the shift to more fuel efficient gear) and lack of quota and restrictive day allocations related to the cod recovery plan in Division VIa.

In Scotland the 'Conservation Credits Scheme' (CCS) was implemented at the beginning of February 2008. The two central themes of CCS are aimed at reducing the amount of cod caught by (i) avoiding areas with elevated abundances of cod through the use of compulsory Real Time Closures (RTCs) and voluntary 'amber zones' and (ii) the use of more species-selective gears. Within the scheme, efforts are also being made to reduce discards generally. Although the scheme is intended to reduce cod mortality, it may also affect the mortality of haddock: vessels may move away from areas inhabited by both cod and haddock and so effect positive change, or, targeting of haddock to compensate for forgone cod catches may increase. Early indications suggest that improved gear selectivity is likely to contribute to reductions in fishing mortality and discard levels, particularly of haddock and whiting.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The analytical age-based assessment is based on landings-at-age data, discard-at-age data, and indices from research vessel surveys. Due

to uncertainties in landings quantity, catch data 1995–2008 were not used in the assessment. The assessment model therefore estimates total catch from the fishery.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for this stock are $F_{pa} = 0.50$, $B_{pa} = 30,000$ t and $B_{lim} = 22,000$ t.

STOCK STATUS:

Based on the most recent estimates of SSB (in 2009), ICES classifies the stock as ‘having reduced reproductive capacity’.

Based on the most recent estimate of fishing mortality (in 2008), ICES classifies the stock as ‘being harvested sustainably’.

The very strong 1999 year-class caused SSB to increase from a level near the historic low in 2000 to a peak in 2003, although SSB has declined since that time.

F has been above F_{pa} in most years since 1987 and is estimated just below F_{pa} in 2008.

The 2003 to 2007 year-classes are estimated to be weak.

RECENT MANAGEMENT ADVICE:

ICES advises, on the basis of exploitation boundaries in relation to precautionary limits, that in the absence of fishing the stock is expected to be rebuilt close to B_{pa} in the short-term and that no fishing should take place in 2010 for haddock in VIa. ICES has also recommended the development of a management plan which is under development.

Other considerations:

Exploitation boundaries in relation to high long-term yield: low risk of depletion of production potential and considering ecosystem effects: The current fishing mortality (2008) is estimated to be 0.46, which is above the rate expected to lead to high long-term yields and low risk of stock depletion.

Exploitation boundaries in relation to precautionary limits: In the absence of fishing, the stock is expected to be rebuilt close to B_{pa} in the short-term.

Recent recruitments to this stock have been poor and both the 2006 and 2007 year-classes are very weak. A complete closure of the haddock fishery in 2010 would bring SSB very close to B_{pa} in 2011.

STECF COMMENTS: STECF agrees with the ICES advice and notes this is consistent with the precautionary approach and notes that this implies closure of all demersal fisheries in VIa that catch haddock. If this cannot be achieved, STECF **recommends** that measures should be taken to ensure a significant reduction in fishing mortality in 2010, which should be maintained in subsequent years until recovery is achieved.

STECF **recommends** that an integrated long-term management plan for the fisheries exploiting haddock and other demersal stocks in VIa should be developed and implemented.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that this stock can be classified under Category 10. Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

Category 10 STECF advises a zero catch, a reduction to the lowest possible level or similar advice.

	2010 TAC	Basis
Category 10	≤ 2640 t	The TAC should be reduced by at least 25%. Recovery measures should be implemented including effort reductions and introduction of more selective fishing gear

3.5. Haddock (*Melanogrammus aeglefinus*) in Division VIb (Rockall)

FISHERIES: Until recently the Rockall haddock fishery largely occurred in summer months, when conditions are easier and particularly when fishing at Rockall was more profitable compared with the North Sea or West of Scotland. A few Irish vessels did however exploit this stock on a more regular basis.

As part of this stock area now falls outside the EU EEZ there was an increase in activity by non-EU fleets, notably Russian Federation vessels, from 1999 onwards, although this has declined in recent years. Catches by non-EU fleets reached a peak in 2004, when reported catches by the Russian Federation amounted to 5,844 tonnes or some 90% of the total.

Between 1987 and 2006, reported landings have varied between 2,300 t and 8,000 tonnes, while for the most recent reported year, 2008, catches by Community vessels (UK Scotland, 1,779 tonnes and Ireland 721 tonnes) together account for 60% of the total catch of 4,221 tonnes with the balance taken by Russian Federation vessels. The total catch of 4,221 tonnes in 2008, is an increase on the 2007 catch of 3,349 tonnes and the 2007 catch of 2,76 tonnes.

Effort by the Irish fleet has increased in recent years at Rockall and anecdotal information suggests that both Irish and Scottish effort will again increase in 2009 largely as a consequence of effort restrictions introduced as part of the long-term plan for cod introduced in 2009.

Haddock are caught in a mixed fishery together with blue whiting and a number of non-assessed species such as grey gurnard. Reported landings in 2007 increased slightly to 2,765 t.

Traditionally Scottish and Irish trawlers target haddock, whilst Russian trawlers also fish for species such as gurnard. UK, Russian and Irish vessels account for the highest proportion of the landings, with smaller quantities taken by other nations including Iceland, France, Spain and Norway.

Following the NEAFC agreement in March 2001, an area of the NEAFC zone around Rockall was closed to fishing using demersal trawls; in spring 2002 part of the shallow water in the EU component also. Effort in the rectangle containing the closure declined when the closure came into effect. There was also a decline in UK effort across the bank as a whole at this time, but an increase of effort in other areas of Division VIb. Spawning biomass has increased since 2003, the fishing mortality has decreased since 2004. The fishing mortality has decreased for small individuals (age 1 and 2) since 2001. However, it is difficult to determine to what extent this may be contributed to the efforts made to protect juveniles in the closed area.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The assessment is based on catch numbers-at-age and one survey index (Scottish Groundfish Survey). Discarding occurs in part of the fishery and has been estimated and used in the assessment. The management body is NEAFC.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for this stock are $F_{pa} = 0.40$, and $B_{pa} = 9,000$ t.

ICES considers that a candidate for a target reference point (consistent with taking high long-term yields and achieving a low risk of depleting the productive potential of the stock) may be around $F_{0.1} = 0.18$, based on total catches including discards).

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and being harvested sustainably. Spawning biomass has increased in recent years as a result of the 2001 and 2005 year-classes. SSB has been above B_{pa} since 2003. Fishing mortality levels have historically been high, between 0.4 and 1.1 for the period 1991-2004. Fishing mortality was above F_{pa} throughout most of the time-series but declined in 2005 to below F_{pa} and remained low in 2006–2008. Current fishing mortality is slightly greater than $F_{0.1}$. Recent recruitments are estimated to be low.

RECENT MANAGEMENT ADVICE:

ICES advises that there is little gain on the long-term yield by increasing fishing mortality above current levels. ICES therefore recommends limiting catches and landings in 2010 to 4,280 t and 3,330 t, respectively.

Other considerations:

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: Fishing mortality around $F_{0.1}$ (0.18) can be considered as a candidate target reference point consistent with taking high long-term yields and achieving a low risk of depleting the productive potential (< 5%). The present fishing mortality (0.23) is above the candidate reference point and below F_{pa} .

Exploitation boundaries in relation to precautionary limits

Fishing mortality should be less than F_{pa} , corresponding to total catches less than 7 090 t in 2010. Assuming that current discarding practices will be continued, landings should be less than 5 480 t in 2010.

STECF COMMENTS: STECF agrees with the advice from ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that this stock can be classified under Category 2.

Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

Category 2 Stock overexploited compared to maximum sustainable yield but inside safe biological limits.

	2010 TAC	Basis
Category 2	4,997 t	Aim to set the TAC to the higher value of (a) to the forecast catch corresponding to taking the highest yield in the long-term, or (b) fishing at an unchanged mortality rate, but do not change the TAC by more than 15%. Limit catches and landings in 2010 to 4,280 t and 3,330 t, respectively.

3.6. Saithe (*Pollachius virens*) in Div's Vb (EU zone), VI, XII and XIV

The assessment has been combined with that in Sub-Area VI – see Section 2.7.

STECF notes that the TAC for that area is set according an EU/Norway management applying a landings split according to the average in 1993–1998, i.e. 90.6% in Sub-area IV and Division IIIa and 9.4% in Sub-area VI..

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED EU/NORWAY MANAGEMENT PLAN.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed EU/Norway management plan the TAC for 2010 should be set at 11,000 t.

3.7. Whiting (*Merlangius merlangus*) in Division VIa (West of Scotland)

FISHERIES: Whiting are taken as part of a mixed roundfish fishery, as well as a by-catch in fisheries for *Nephrops*. Scottish trawlers take most of the whiting catch in Division VIa. Since 1976, Scottish heavy trawl and seine effort has declined, whilst that of light trawlers has generally increased. Ireland and France take smaller proportions of the catch and all the remaining catch is taken by EU vessels. Approximately 50% of the total catch in weight is discarded. Since 1987, human consumption landings declined from about 11,500 t to an historic low of 290 t reported officially in 2005. Reported landings for 2008 have increased to 441 t.

The fishery is regulated by a TAC that does not, however, seem to restrict catches. However, the increase in minimum mesh size from 100 to 120 mm in 2001/2002 (before the introduction of effort regulation 27/2005) partly caused a shift to 80-mm mesh sizes in the mixed fishery trawls, due to the loss of valuable *Nephrops* catches. Poorer selectivity at this mesh size may have led to increased discarding and high grading. With the introduction of effort regulation, vessel operators have effectively been further encouraged to reduce mesh size and shift to other fisheries, particularly *Nephrops* trawling, in order to gain more days-at-sea. There is insufficient information to quantify any effect mesh size changes and effort limitations may have had on the stock of whiting. However, any management measures leading to a shift of vessels to smaller mesh sizes will result in a worse exploitation pattern and higher discards.

Emergency EU measures directed towards cod protection were established in the first half of 2001 and led to short-term area closures in the north of the Division VIa and, on a smaller scale, in the Clyde Sea area. The Clyde closure continued in 2002-2008 under national UK legislation.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. No assessment was carried out in 2008. Previously a survey-based assessment was used to evaluate trends in SSB, total mortality, and recruitment.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.6$, $B_{pa} = 22,000$ t.

STOCK STATUS: The state of the stock is unknown, but long-term information on the historical yield and catch composition and the survey-based assessment conducted in 2007 all indicate that the present stock size is at a historical low. Total mortality has been higher in the last decade than in the previous one. Recruitment in the most recent years is estimated to be very low.

RECENT MANAGEMENT ADVICE: ICES advice is unchanged from 2008. Given that SSB is estimated at the lowest observed level and total mortality at the highest level over the time period, catches in 2010 should be reduced to the lowest possible level.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that the mixed fisheries advice implies a zero catch of whiting.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Whiting in VIa can be classified under Category 10.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

Category 10 STECF advises a zero catch, a reduction to the lowest possible level or similar advice.

	2010 TAC	Basis
Category 10	≤ 431 t	The TAC should be reduced by at least 25%. Recovery measures should be implemented including effort reductions and introduction of more selective fishing gear

3.8. Whiting (*Merlangius merlangus*) in Division VIb (Rockall)

FISHERIES: Landings of whiting from Division VIb are negligible, 31t in 2008.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. No assessment has been carried out.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: The state of the stock is unknown.

RECENT MANAGEMENT ADVICE: No advice has been provided.

STECF COMMENTS: STECF has no comments.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Whiting in VIb can be classified under Category 11.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 11	NE*	No advice

*NE- not estimable

3.9. Anglerfish (*Lophius piscatorius*) in Vb (EU zone), VI, XII, XIV

FISHERIES: The main fishery is in Sub-Area VI where anglerfish have become the subject of a directed trawl fishery. They are also taken as a by-catch in trawl fisheries targeting roundfish species and *Nephrops*. The main exploiters are the UK, France and Ireland, with smaller landings reported by other nations including Norway, Spain and Denmark. Vessels from EU Member States take most of the catch. ICES estimates of landings of

anglerfish in Division VI show a similar trend to those in the North Sea – a rapid increase in the late 1980s (from about 6,000 t in 1989 to about 18,000 t in 1996) followed by a continuous decline since 1996 to 5200 t in 2004 . No estimate of total landings is available since 2005. Official landings in 2008 are around 4100 t. Anglerfish are caught widely in VIa with the highest catch rates occurring along the shelf edge in deeper waters.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The assessment now includes anglerfish from Sub-area IV. The information basis for anglerfish is being developed, with improvements to both industry related data and surveys. There is currently insufficient data to support an assessment of the state of the stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for this stock. ICES has previously defined a precautionary fishing mortality reference point of $F_{pa}=0.3$ (based on $F_{35\%SPR}$), but have been unable to discover the basis for this calculation and so no longer considers it appropriate. New reference points will be defined when a new assessment procedure is developed.

STOCK STATUS: There are major uncertainties about catch and effort data for anglerfish, as well as limited knowledge about population dynamics and distribution. The available information is inadequate to evaluate spawning stock or fishing mortality relative to risk. A recently conducted fishery independent survey has indicated an increasing trend in biomass in areas VI and IV since 2005. The new data available this year for this stock do not change the perception of the stock status.

MANAGEMENT OBJECTIVES: There are no explicit management objectives for this stock but the European Community and Norway are in discussions regarding the joint management of this shared stock.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of precautionary considerations that the effort in fisheries that catch anglerfish should not be allowed to increase.

The advice for the fishery in 2010 is the same as the advice given in 2008 for the 2009 fishery: The effort in fisheries that catch anglerfish should not be allowed to increase and the fishery must be accompanied by mandatory programmes to collect catch and effort data on both target and by-catch fish.

STECF COMMENTS: STECF agrees with the ICES advice.

STECF also notes that following ICES suggestions in 2005 a number of initiatives were instigated covering anglerfish in Division IVa and Subarea VI: dedicated Scottish and Irish scientific anglerfish surveys which are coordinated to involve the use of both research vessels and commercial fishing vessels; a Scottish tallybook scheme (linked to a longer time-series of personal diaries); increased observer coverage (short-term initiative in 2006). Data are currently being gathered, with improvements to both industry-related data and surveys covering Subarea VI and part of the North Sea. There are currently only four years of survey data and that is considered not long enough for an assessment of the state of the stock.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, Anglerfish in Division Vb, Subareas VI, XII and XIV cannot be classified under any of the categories listed.

3.10. Megrim (*Lepidorhombus whiffiagonis* and *Lepidorhombus boscii*) in ICES Subarea VI (West of Scotland and Rockall).

The stock summary and advice for megrim in Subarea VI is given together with Divisions Vb, XII and XIV in Section 2.11.

3.11. Megrim (*Lepidorhombus whiffiagonis*.) in Vb (EU zone), VI, XII & XIV

FISHERIES: The main fishery is in Sub-Area VI where megrim is taken as a by-catch in trawl fisheries targeting anglerfish, roundfish species and *Nephrops*. Since 2009, ICES also provides advice on megrim in Subarea IV (North Sea). This is because the spatial distribution of landings data and survey catches provide good evidence to suggest that megrim population is contiguous between Divisions IVa and VIa.

The main exploiters are the UK ($\geq 80\%$ of catch in the past 3 years), Ireland and France.

Between 1990 and 2008 nominal catches of Megrim in Division VIa, VIb and subarea IV as officially reported to ICES have ranged from 1,920 t in 2005 to 6,148 t in 1996. Although combined landings generally declined between 1996 and 2005, they have increased each years from 2005 to 2009. Combined landings in 2008 were 2,951 tonnes.

It is unclear if the trends in landings reflects trends in abundance or are a consequence of changes in trawl effort observed over the period.

- Recent reductions in effort in Scotland and Ireland are considered to have contributed to the decline of landings in Subarea VI.
- In 2009 new mesh regulations introduced in Division VIa have increased the mesh size from 100 to 120 mm (vessels >15 m); this will result in an increase in the length of first capture. This measure, coupled with further effort restrictions associated with the long-term management plan for cod (Council Regulation (EC) No 1342/2008), is likely to result in further effort displacement away from the shelf fisheries in Division VIa, with indications of effort switching to Rockall (Division VIb). However, at this stage it is not possible to quantify this until an integrated analysis of VMS and logbook data is conducted.
- Landings in VI are well below the TAC. Uptake by France, who account for 44% of the TAC, is very low (~11%).
- Official landings in Sub-area IV and Division IIa in recent years are close to the TAC.

In the past, management of the megrim stock has been linked to that for anglerfish on the assumption that landings were correlated in the fishery. This may no longer be true due to recent changes in the fishing pattern in the Scottish and Irish fleets, and the dynamics of the species are probably not linked.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. In recent years there has been no analytical assessment for this stock and the management advice has been based on average landings. This year the advice is based on effort.

While the information basis for megrim is being developed, with improvements to both industry-related data and surveys, there is currently only four years of survey data and that is considered not long enough for an assessment of the state of the stock. Overall, the quality of the available landings data and discard information, as well as a lack of effort and cpue data for the main fleet in the fishery, severely hampers the ability of ICES to carry out an assessment. For stocks like megrim (and anglerfish) on the Northern Shelf, there is a general need for improved spatio-temporal resolution of commercial catch and effort data through integration of VMS and logbook data.

Since 2009, ICES also provides advice on megrim in Subarea IV (North Sea). This is because the spatial distribution of landings data and survey catches provides good evidence to suggest that megrim population is contiguous between Divisions IVa and VIa.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS:

A recently developed fishery independent survey suggests an increasing trend in biomass in both areas VI and IV since 2005.

RECENT MANAGEMENT ADVICE: ICES advises, on the basis of exploitation boundaries in relation to precautionary considerations that the effort in fisheries that catch megrim should not be allowed to increase.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that scientific surveys show that a significant population of megrim exists in the northern part of Division IVa and landings are reported from this area. However, this stock component is not considered by any ICES expert group. Recent surveys aimed at providing a scientific basis for anglerfish management, could potentially be used for the assessment of megrim stocks in Subarea VI and Division IVa. Area misreporting between IVa and VI still appears to be a problem due to the association of megrim with anglerfish catches.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, Megrim in Division Vb, Subareas VI, XII and XIV can not be classified under any of the categories listed.

3.12. Plaice (*Pleuronectes platessa*) - Vb (EU zone), VI, XII, XIV

STECF did not have access to any stock assessment information on plaice in these areas.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that this stock can be classified under Category 11.

Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	668 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

3.13. Sole (*Solea solea*) – VIIhjk

FISHERIES: Sole are predominantly caught within mixed species otter trawl fisheries in Division VIIj. These vessels target mainly hake, anglerfish, and megrim. Beam trawlers and seiners generally take a lesser catch of sole. Ireland is the major participant in this fishery with around 50% of the international landings between 1993-2001. Landings have been fluctuating between 655 tonnes and 1104 tonnes over the period 1973-1998. Since then landings have been around 500 tonnes. Landings in 2008 are estimated to be 204 tonnes.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been proposed for this stock

STOCK STATUS: The available information is inadequate to evaluate stock trends. Exploratory estimates of mortality suggest that this stock is not severely overexploited. The state of the stock is unknown and there is no basis for advice.

RECENT MANAGEMENT ADVICE:

STECF COMMENTS:

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Sole in VIIh,j,k can be classified under Category 11.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 11	470 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

3.14. Sole (*Solea solea*) - VIIbc

FISHERIES: Ireland is the major participant in this fishery. Sole are normally caught in mixed species otter trawl fisheries in Division VIIb. These vessels mainly target other demersal fish species and *Nephrops*.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been proposed for this stock

STOCK STATUS: The state of the stock is unknown. No assessment was performed, due to the short series of data and lack of reliable tuning indices.

RECENT MANAGEMENT ADVICE: Recent catches have varied between 78 t in 2000 and 37 t in 2008 and have been close to the TAC.

Single-stock exploitation boundaries: The available information is insufficient to evaluate stock trends. Therefore the state of the stock is unknown and there is no basis for advice.

STECF COMMENTS: STECF agrees with the advice from ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Sole in VIIbc can be classified under Category 11.

Accordingly STECF notes that the rules for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 11	43 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

3.15. Norway pout (*Trisopterus esmarki*) in Division VIa (West of Scotland)

FISHERIES: Total landings are available for this stock for the years 1987 – 2008. Landings during this period have varied considerable, from a high in 1987 of some 38,000 tonnes to less than 50 tonnes every year since 2005. Historically the majority of landings have been taken by Danish fleets with lesser catches by UK, Netherlands and Germany.

There are currently no dedicated fisheries for Norway Pout in Division VIa (West of Scotland).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No fishing mortality or biomass reference points are defined for this stock.

STOCK STATUS: The available information is inadequate to evaluate the state of the stock.

RECENT MANAGEMENT ADVICE: The only data available are official landings statistics which have been highly variable and do not provide an adequate basis for scientific advice.

STECF COMMENTS: STECF notes that there are currently no dedicated fisheries for Norway Pout in Division VIa (West of Scotland).

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Norway pout in division VIa can be classified under Category 11.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 11	NE*	No advice

*NE - Not estimable

3.16. Sandeel (*Ammodytes spp.* & *Gymnammodytes spp.*) in Division VIa

FISHERIES: In the past the stocks were exploited exclusively by Scottish vessels. Recorded landings were between 15,000 t and 25,000 t from 1987 to 1990. Landings of between 5,000 t and 13,000 t were taken between 1991 and 2000 (except for 2,600 t in 1999). From 2001 landings fell sharply. The last recorded landings by Scotland were in 2004. Recorded landings have been zero in 2003, 2005, 2006 and 2008. In 2007 57 t were reported landed by the Faroe Islands, the first time this country has reported landings of sandeel from VIa.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The only recent data available, however, are official landings statistics which have been highly variable and do not provide an adequate basis for scientific advice. The stock was last assessed in 1996.

PRECAUTIONARY REFERENCE POINTS: none.

STOCK STATUS: The available information is inadequate to evaluate stock trends relative to risk, so the state of the stock is unknown.

RECENT MANAGEMENT ADVICE: none.

STECF COMMENTS: STECF notes that work to better understand potential trends in natural mortality on cod in division VIa by modelling seal predation has been hampered because the level and trend in sandeel biomass available to the seal population west of Scotland is not known. As such, a lack of knowledge about this stock is potentially adversely affecting assessment of stocks of high commercial importance in the area.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

There is no TAC set for sandeel in VIa.

3.17. Rays and skates in ICES Subareas VI and VII

Previous stock summaries and advice on skates and rays has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice at the level of ICES Subareas VI and VII. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for skates and rays in ICES Subareas VI and VII was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Section 6.1 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

3.18. Catsharks and Nursehounds (*Scyliorhinus canicula* and *Scyliorhinus stellaris*) in Subareas VI and VII

Previous stock summaries and advice on skates and rays has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice at the level of ICES Subareas VI and VII. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for catsharks and nursehounds in ICES Subareas VI and VII was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Section 6.3 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

3.19. Tope (*Galleorhinus galeus*) in ICES Subareas VI and VII

Previous stock summaries and advice on tope has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice at the level of ICES Subareas VI and VII. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for tope in ICES Subareas VI and VII was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Section 6.5 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

3.20. Other demersal elasmobranchs West of Scotland

Previous stock summaries and advice on demersal elasmobranchs has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice for demersal elasmobranchs West of Scotland. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for demersal elasmobranchs in the area West of Scotland was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Section 6.1 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

3.21. Herring (*Clupea harengus*) in Division VIa North

FISHERIES: Historically, catches have been taken from this area by three fisheries:

- i) A Scottish domestic pair trawl fleet and the Northern Irish fleet operating in shallower, coastal areas, principally fishing in the Minches and around the Island of Barra in the south; younger herring are found in these areas. This fleet has reduced in recent years.
- ii) The Scottish single-boat trawl and purse seine fleets, with refrigerated seawater tanks, targeting herring mostly in the northern North Sea, but also operating in the northern part of Division VIa (N). This fleet now operates mostly with trawls, but many vessels can deploy either gear.
- iii) An international freezer-trawler fishery has historically operated in deeper water near the shelf edge where older fish are distributed. These vessels are mostly registered in the Netherlands, Germany, France, and England, but most are Dutch owned.

In recent years the age structure of the catch of these last two fleets has become more similar. A stricter enforcement regime in the UK is responsible for the major decrease in area misreporting in 2006.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment in 2009 is based on catch data and an acoustic survey. This assessment is considered to be noisy but unbiased. Misreporting has decreased since 2006 and the quality of the catch data has improved. The basis for the advice has changed from last year and allows for an increase in catch in line with the agreed management plan. This management plan was evaluated by ICES in 2005 and found to be consistent with the precautionary approach.

PRECAUTIONARY REFERENCE POINTS: Precautionary management reference points have only been set for spawning stock biomass (B_{lim} has been set at 50 000 t and B_{pa} is not defined). There are no proposed fishing mortality reference points. F_{mgt} has been set at 0.25.

STOCK STATUS: In the absence of precautionary reference points the state of the stock cannot be evaluated. An analytical assessment shows that SSB (in 2009) is 1.8 times B_{lim} . ICES considers that the stock over recent years has been fluctuating at a low level and is being exploited close to F_{msy} . Recruitment has been very low since 1998, and the 2001 and 2002 year-classes are weak.

MANAGEMENT AGREEMENT: The EU adopted a management plan on 18 December 2008 (Council Regulation (EC) 1300/2008) based on the following rule;

SSB in the year of the TAC	Fishing mortality	TAC constraint
SSB > 75 000 t	$F = 0.25$	20%
SSB < 75 000 t	$F = 0.2$	20%

SSB < 62 500 t	F = 0.2	25%
SSB < 50 000 t (B _{lim})	F = 0	-

A similar proposed management plan was evaluated by ICES in 2005 and found to be consistent with the precautionary approach. In 2008 ICES checked that the recent changes in stock dynamics and the changes to the plan had not significantly increased the risks. ICES gives advice based on the management plan.

Agreed Management Plan for VIaN herring: Council Regulation 1300/2008

1. Each year, the Council, acting by qualified majority on the basis of a proposal from the Commission, shall fix for the following year the TAC applicable to the herring stock in the area west of Scotland, in accordance with paragraphs 2 to 6.

2. When STECF considers that the spawning stock biomass level will be equal or superior to 75 000 tonnes in the year for which the TAC is to be fixed, the TAC shall be set at a level which, according to the advice of STECF, will result in a fishing mortality rate of 0.25 per year. However, the annual variation in the TAC shall be limited to 20%.

3. When the STECF considers that the spawning stock biomass level will be less than 75 000 tonnes but equal or superior to 50 000 tonnes in the year for which the TAC is to be fixed, the TAC shall be set at a level which, according to the advice of STECF, will result in a fishing mortality rate of 0,2 per year. However, the annual variation of the TAC shall be limited to:

(a) 20% if the spawning stock biomass level is estimated to be equal or superior to 62 500 tonnes but less than 75 000 tonnes;

(b) 25% if the spawning stock biomass level is estimated to be equal or superior to 50 000 tonnes but less than 62 500 tonnes.

4. When STECF considers that the spawning stock biomass level will be less than 50 000 tonnes in the year for which the TAC is to be fixed, the TAC shall be set at 0 tonnes.

5. For the purposes of the calculation to be carried out in accordance with paragraphs 2 and 3, STECF shall assume that the stock will experiences a fishing mortality rate of 0,25 in the year prior to the year for which the TAC is to be fixed.

6. By way of derogation from paragraphs 2 or 3, if STECF considers that the herring stock in the area west of Scotland is failing properly to recover, the TAC shall be set at a level lower than that provided for in those paragraphs.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the agreed management plan. This corresponds to catches weighing no more than 24,420t in 2010

Other considerations:

Exploitation boundaries in relation to the proposed management plan

Following the agreed management plan implies catches of no more than 24 420 tonnes in 2010, which is expected to lead to an SSB of 94 000 t in 2011. The agreed management plan is consistent with the precautionary approach.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects

Fishing mortality in the range of the target mortality of the proposed management plan is expected to give a high long-term yield and a low risk of stock depletion.

Exploitation boundaries in relation to precautionary limits

Precautionary reference points for fishing mortality have not been defined for this stock. Any management measures should have a high probability of avoiding B_{lim} .

In addition, ICES offers the following considerations:

The stock identity of herring west of the British Isles was reviewed by the EU-funded project WESTHER. This identified Division VIaN as an area where catches comprise a mixture of fish from Divisions VIaN, VIaS, and VIIaN. Concerning the management plan for Division VIaN, ICES has advised that herring components should be managed separately to afford maximum protection. If there is an increasing catch on the mixed fishery in Division VIaN, this should be considered in the management of the Division VIaS component which is in a depleted state. In 2008 ICES will begin to evaluate management for this Division and also VIaS and VIIaN. It will be a number of years before ICES can provide a fully operational integrated strategy for these units. In this context ICES recommends that the previously endorsed plans for Division VIaN should be continued.

STECF COMMENTS: STECF agrees with the ICES advice.

STECF notes the new management plan for this stock adopted in 2008. It is similar to the one evaluated by ICES in 2005 and found to be precautionary.

STECF notes that the 2009 assessment has resulted in a downward revision of F_{by} 37% and an upward revision of SSB by 49% compared to 2008 values.

STECF notes the ICES consideration regarding the results of the EU funded project WESTHER which have shown that the herring populations in this area and in VIaS, VIIb,c and VIIa (N) form a metapopulation. In 2008 ICES began to evaluate management for this metapopulation. In the meantime, each population will continue to be managed separately. The management plan for VIaN should be continued.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (Council Regulation (EC) 1300/2008).

STECF notes that this plan has been evaluated to be consistent with the precautionary approach.

STECF therefore advises that according to the agreed management plan the TAC for 2010 should be set at 24,420 t.

3.22. Herring (*Clupea harengus*) in the Clyde (Division VIa)

The following text remains unchanged because ICES has not undertaken any new assessments or provided any new advice since 2005.

FISHERIES: There are two stock components present on the fishing grounds, resident spring-spawners and immigrant autumn-spawners. The UK exploits the small stock of herring in this area. TACs have been set at 800 t since 2006. Since 1999, annual landings have varied from no fishing in 2004 to around 600 t in 2007.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No analytical assessment has been made in recent years and no independent survey data are available for recent years.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS The available information is inadequate to evaluate stock trends, and the state of the stock is uncertain.

RECENT MANAGEMENT ADVICE: Until new evidence is obtained on the state of the stock, existing time and area restrictions on the fishery should be continued in 2010.

STECF COMMENTS: STECF agrees with the previous advice from ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Herring Clyde VIa can be classified under Category 11.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 11	NE*	No advice

*NE Not estimable

3.23. Herring (*Clupea harengus*) in Division VIa south and VIIbc

FISHERIES: In recent years only Ireland and the Netherlands have recorded catches from this area with minimal landings taken by the Netherlands in 2007. Catches in 2008 amounted to 10,237 t which is a decrease on the 2007 figure (12,675 t). The fishery exploits a mixture of autumn-and winter/spring-spawning fish. The winter/spring-spawning component is distributed in the northern part of the area. The main decline in the overall stock appears to have taken place on the autumn-spawning component.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Exploratory assessment runs showed similar trends in stock development over a range of assumptions.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are $B_{pa} = 110,000$ t, $B_{lim} = 81,000$ t $F_{pa} = 0.22$ and $F_{lim} = 0.33$.

STOCK STATUS: Exploratory assessments suggest that SSB may be stable at a low level. The current level of SSB is uncertain but likely to be below B_{lim} . There is no evidence that large year-classes have recruited to the stock in recent years. F is likely to be above F_{pa} and also likely to be above F_{lim} .

RECENT MANAGEMENT ADVICE:

The updated exploratory assessment available for this stock does not change the perception of the stock and does not give reason to change the advice from 2008. The advice for the fishery in 2010 is therefore the same as the advice given in 2008 for the 2009 fishery: "ICES recommends a rebuilding plan be put in place that will reduce catches. If no rebuilding plan is established, there should be no fishing. The rebuilding plan should be evaluated with respect to the precautionary approach".

In addition, ICES offers the following considerations:

The stock identity is complex as the juveniles mix with those from the west of Scotland and the adults mix with those from the Irish Sea and Division VIaN over the shelf areas to the west of Scotland after spawning. The stock identity has been reviewed by an EU-funded project WESTHER. Therefore, the assessment and advisory framework for this stock is being reviewed. The results of this work are expected to be available for the ICES advice in 2010.

There is no explicit management plan for this stock. The local Irish management committee developed the objective to rebuild the stock to above B_{pa} (110,000 t) and has a long-term objective to achieve catches of 25,000 t per year. Although there is little information on recruitment available, it is unlikely that it is above average and it may possibly be below average. The long-term catch aspiration of the local management committee is not likely to be achievable at current stock productivity. A rebuilding plan is urgently required and should include further substantial reductions in catches.

STECF COMMENTS: STECF agrees with the ICES advice.

STECF notes the ICES advice that there should be no fishing of this stock unless a rebuilding plan is put in place. This implies that the TAC should be reduced by at least 25% and recovery measures should be implemented.

STECF notes the ICES consideration regarding the results of the EU-funded project WESTHER which have shown that the herring populations in this area and in VIaN, and VIIa (N) form a metapopulation. In 2008 ICES began to evaluate management for this metapopulation. In the meantime, each population will continue to be managed separately.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Herring in Divisions VIaS and VIIbc can be classified under Category 10.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

Category 10 STECF advises a zero catch, a reduction to the lowest possible level or similar advice or a rebuilding plan should be set into place.

	2010 TAC	Basis
Category 10	≤ 7000 t	The TAC should be reduced by at least 25%. Recovery measures should be implemented including effort reductions and introduction of more selective fishing gear

3.24. Herring (*Clupea harengus*) in Division Vb and VIb.

No assessment is made for these areas and no information was available to STECF from these areas.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Herring in Divisions Vb and VIb can be classified under Category 11.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 11	NE*	No advice

*NE – Not estimable

3.24.1. Special request on Herring VIIa South & Celtic Sea

STECF is requested to explain why the advice completely changes within one year (from "no fishing without plan" in 2008 to "harvest of 10 000 tonnes" in 2009).

STECF response

STECF notes that the change in advice is primarily a result of increased confidence in the 2009 ICES assessment of the state of the stock. In 2008 the ICES assessment was exploratory and could only be considered indicative of stock trends and the recent estimates of F, SSB and recruitment were too poorly defined to be used as a basis for a catch forecast. The assessment in 2009 included a revision of input data, reduction of the age of the plus-group and a longer time series of reliable survey data which gave rise to an acceptable model fit. The 2009 assessment was therefore accepted as a basis for providing catch options for 2010.

ICES based its advice on fishing opportunities for 2010 on the proposed rebuilding plan and a fishing mortality rate of 0.19, which ICES considers is in line with the precautionary approach. This gives rise to an estimated catch in 2010 of 10,150 t.

4. Resources in the Celtic and Irish Seas

4.1. Norway lobster (*Nephrops norvegicus*) in Division VII

Norway lobster in Division VII contains 6 Functional Units:

FU no.	Name	ICES Divisions	Statistical rectangles
14	Irish Sea East	VIIa	35–38E6; 38E5
15	Irish Sea West	VIIa	36E3; 35–37 E4–E5; 38E4
16	Porcupine Bank	VIIb,c,j,k	31–36 D5–D6; 32–35 D7–D8
17	Aran Grounds	VIIb	34–35 D9–E0
19	Ireland SW and SE coast	VII,g,j	31–33 D9–E0; 31E1; 32E1–E2; 33E2–E3
20–22	Celtic Sea	VIIg,h	28–30 E1; 28–31 E2; 30–32 E3; 31 E4

Of these, FU 15 (Irish Sea W.) and FU 17 (Aran Grounds) are assessed on basis of UWTv surveys. On basis on the UWTv surveys current stock abundance and harvest ratios are estimated. The HRs advised by ICES aim at exploitation rates between $F_{0.1}$ and F_{MAX} according to the options/decision rules given in the table:

F relative to $F_{0.1}$ and F_{MAX}	SSB Stable or Increasing	SSB Decreasing
$F > F_{MAX}$	Reduce F to F_{MAX}	Reduce F to $F_{0.1}$
$F_{MAX} > F > F_{0.1}$	Maintain current F	Reduce F to $F_{0.1}$
$F < F_{0.1}$	Increase F to $F_{0.1}$	Maintain current F

STECF considers that it is premature to use the decision rules advocated by ICES as a basis for setting fishing opportunities without a proper evaluation of the likely outcome of such a rule. In view of this, STECF **recommends** that the decision rules advocated by ICES should not form the basis of setting fishing opportunities for 2010 for those *Nephrops* FUs to which it has been applied. The rationale behind this recommendation is given in Section 1.1 of this report.

For the FUs covered by UWTv surveys new advice for 2010 is provided. The advice for 2010 for the other FUs is the same as for 2009 (biennial advice given in 2008). A summary of the TAC advice for 2010 for the six Functional Units in VII, is as follows: Irish Sea E. (FU14) = 1000 t, Irish Sea W. (FU15) = 5465 t, Porcupine Bank (FU16) = 0 t, Aran Grounds (FU 17) = 505 t, SE & SW coasts of Ireland (FU 19) = 800 t and Celtic Sea (FUs 20-22) = 5300 t.

STECF COMMENTS: STECF notes that the current management approach with an aggregated TAC for VII (which comprises 6 *Nephrops* FUs), runs the risk of unbalanced effort distribution. This has appeared to be a particular problem in the Porcupine bank, where a large increase in effort over the past 5 years has occurred with a subsequent substantial decline in the stock. In addition, STECF notes that aggregated management of all *Nephrops* FUs in VII as one single unit is a major obstacle for a management complying with the Commissions Communication on Fishing opportunities for 2010 (COM (2009) 224).

4.1.1. Norway lobster (*Nephrops norvegicus*) in FU 14, Irish Sea East (Division VIIa)

FISHERIES: Prior to 2007 landings from this FU was believed to be underreported. However, new legislation in 2007 increased the reliability of the landings data. Estimates of landings in 2007 were 959 t. Most of the landings are taken by the UK with the Republic of Ireland taking the remainder. The *Nephrops* trawl fisheries take by-catches of other species such as cod and particularly juvenile whiting.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Biennial advice (for 2009 and 2010) for this stock was provided in 2008. The advice was based on trends in the surveys and fisheries indicators.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been determined for *Nephrops* in this stock.

STOCK STATUS: Mean size and sex ratios in the catches are stable. Landing per unit effort (lpue) indicators do not show signs of decrease in recent years. The stock is considered to be stable.

RECENT MANAGEMENT ADVICE: The current fishery appears sustainable. Therefore, ICES recommends that *Nephrops* fisheries should not be allowed to increase relative to 2007. This corresponds to landings of no more than 1,000 tonnes for the Eastern Irish Sea stock (FU 14) in 2009 and 2010.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that landings by some fleets prior to 2007 are thought to have been underreported. The implementation of the Buyers and Sellers legislation in the UK in 2006 and “sales notes” in Ireland in 2007, coupled with the increased TAC in 2007, is thought to have improved the reliability of reported landings data. Therefore the advice for this stock refers to landings in 2007 only and does not use landings data prior to 2007. STECF agrees with ICES approach and advice that, as a temporary measure, the use of average landings from a period when these are considered accurate offers a way of giving catch advice. STECF welcomes the commitment by ICES to hold a workshop specifically tasked to develop improved methods for utilising TV survey data, particularly in view of the fact that average landings approaches are unsuitable in situations where the stock abundance is observed to be increasing or decreasing.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in Irish Sea East (FU 14) can be classified under Category 6.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

2010 TAC	Basis
Category 6*	NE** No TAC set for separate functional units.

*Biennial advice for 2009 and 2010

**NE – Not estimable

4.1.2. Norway lobster (*Nephrops norvegicus*) in FU 15, Irish Sea West (Division VIIa)

FISHERIES: Prior to 2007 landings from this FU are believed to be underreported. However, new legislation in 2007 increased the reliability of the landings data. Estimates of landings in 2007 were 8461 t from the Irish Sea West. Most of the landings are taken by the UK and the Republic of Ireland. The *Nephrops* trawl fisheries take by-catches of other species such as cod and particularly juvenile whiting. 2008 landings from this FU were more than 10500 t, an increase of 25% compared to 2007 landings.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based UWTV surveys of absolute abundance. At the ICES Benchmark Workshop on *Nephrops* in 2009 the major sources of bias associated to UWTV survey estimates of absolute abundance were quantified and an overall bias correction factor derived.

PRECAUTIONARY REFERENCE POINTS: No biological reference points have been determined for this stock of *Nephrop*, Instead, as mentioned in the introduction, F_{MAX} and $F_{0.1}$ are used as reference points

Reference points

<i>F</i>	<i>Harvest</i>
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<i>reference point</i>	<i>Ratio</i>
$F_{0.1}$	12.2%
F_{MAX}	20.4%

STOCK STATUS: The stock is overfished. UWTV survey abundance estimates declined by 38 % between 2004 and 2008. 2008 catch rates from trawl surveys are close to the long-term mean of the series. Sex ratio and mean size from commercial catches and surveys remain stable. However, $F(2008)$ is above F_{MAX} .

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to high long-term yield and low risk of depletion of production potential that the Harvest Rate for *Nephrops* fisheries should not exceed $F_{0.1}$. This corresponds to landings of no more than 5 892 t for the western Irish Sea stock.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that landings by some fleets prior to 2007 are thought to have been underreported. The implementation of the Buyers and Sellers legislation in the UK in 2006 and “sales notes” in Ireland in 2007, coupled with the increased TAC in 2007, is thought to have improved the reliability of reported landings data. STECF notes that the advised landings for 2010 imply a reduction of 44% relative to the 2008 landings (10 500t). STECF further agrees with ICES that a stepwise approach could be considered in this case. To move toward a fishing mortality corresponding to MSY in steps, a reduction of the catch corresponding to F_{MAX} could be considered as an intermediate step toward $F_{0.1}$ (as a proxy for F_{msy}). Alternatively, a constraint on the year-to-year change in catches as is typical of management plans might be considered.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in Irish Sea West (FU 15) can be classified under Category 6.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

2010 TAC	Basis
Category 6	NE** State of stock not known precisely.

**NE – Not estimable

STECF notes that the advised catch for 2010 should not exceed 5 892 t

4.1.3. Norway lobster (*Nephrops norvegicus*) in FU19, SW and SE Ireland (Divisions VII g, j)

FISHERIES: Reported landings for this FU were 866 t in 2008, but there are concerns about the accuracy of the landings statistics in some fleets. Similar to the situation in Aran Grounds the most recent change in the fishery is the proportion of twin-rig vessels, which has increased to over 90 % of the fleet in the past eight years. This implies a large increase in effective effort, even if such an increase is not observed in the nominal effort figures.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Biennial advice (for 2009 and 2010) for this FU was provided in 2008. Analytical assessments are not feasible at present.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been established for this FU.

STOCK STATUS: Stock status is not known. Landings have been variable throughout the time-series, reaching the highest observed levels in 2002–2004. Landings from 2005 onwards have been around the average. LPUE has fluctuated without a detectable trend over the short time-series.

RECENT MANAGEMENT ADVICE: The current fishery appears sustainable. Therefore, in 2008 ICES recommended that *Nephrops* fisheries should not be allowed to increase relative to 2007. This corresponds to landings of no more than 800 tonnes for the Ireland SW and SE Coast (FU 19).

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that landings by some fleets prior to 2007 are thought to have been underreported. The implementation of “sales notes” in Ireland in 2007, coupled with the increased TAC in 2007, is thought to have improved the reliability of reported landings data. Therefore the advice for this stock refers to landings in 2007 only and does not use landings data prior to 2007.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in SW and SE Ireland (FU 19) may be classified under Category 6

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 6*	NE**	State of stock not known precisely.

*Biennial advice for 2009 and 2010

**NE – Not estimable

STECF notes that the advised catch for 2010 should not exceed 800 t

4.1.4. Norway lobster (*Nephrops norvegicus*) in FU 20-22, Celtic Sea (Divisions VIII, g, h)

FISHERIES: There are three Functional Units in the Celtic Sea area but they are treated as one. Landings from this stock are reported by France, the Republic of Ireland and the UK, the main contributors being France and Ireland. In 2008 total reported landings amounted to 6012 t. France accounted for 2348 t and Ireland for 3428 t, while UK took 242 t. There has been a considerable increase in Irish landings, from around 500 t in 1990 to more than 3,400 t in 2008. There has also been increasing effort by Irish vessels targeting *Nephrops* in the Celtic Sea in recent years. Discarding is substantial, but varies between fleets and areas.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Biennial advice (for 2009 and 2010) for this FU was provided in 2008. The advice is based on recent average landings and indicators for LPUE and CPUE.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these FUs.

STOCK STATUS: No assessment is available. In 2006 and 2007 mean sizes in landings for the Irish and French fleets decreased consistent with higher recruitment in recent years. LPUE indicators do not show signs of decrease in recent years. The stock is considered to be stable.

RECENT MANAGEMENT ADVICE: The current fishery appears sustainable. Therefore, ICES recommends that *Nephrops* fisheries should not be allowed to increase relative to 2007. This corresponds to landings of no more than 5300 tonnes for the Celtic Sea stock (FU20-22).

STECF COMMENTS: STECF agrees with the advice from ICES. Landings by some fleets prior to 2007 are probably underreported. The implementation of the Buyers and Sellers legislation in the UK in 2006 and “sales notes” in Ireland in 2007, coupled with the increased TAC in 2007, is thought to have improved the reliability of reported landings data. Therefore the advised TAC for this stock refers to landings in 2007 only and does not use landings data prior to 2007. STECF notes that the TAC is set for Sub-area VII, and this may allow unrestricted catches for Functional Units where restrictions on catches should in fact apply. STECF further notes that the discarding of small *Nephrops* is substantial.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in Celtic Sea (FUs 20-22) may be classified under Category 6

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 6*	NE**	State of stock not known precisely.

*Biennial advice for 2009 and 2010

**NE – Not estimable

STECF notes that the advised catch for 2010 should not exceed 5300 t.

4.2. Cod (*Gadus morhua*) in area VIIa (Irish Sea Cod)

FISHERIES: The Irish Sea cod fishery has traditionally been carried out by otter trawlers targeting spawning cod in spring and juvenile cod in autumn and winter. Activities of these vessels have decreased, whilst a fishery for cod and haddock using large pelagic trawls increased substantially during the 1990s. In recent years the pelagic fishery has also targeted cod during the summer. Cod are also taken as a by-catch in fisheries for *Nephrops*, plaice, sole and rays. Landings are taken entirely by EU fleets and were between 6,000 t and 15,000 t from 1968 to the late 1980s. There has since been a steep decline in landings to levels as low as 1,300 t in 2000. There has been a slight increase from this level in 2001 and 2002 (up to 2,700 t) but since then, landings have continuously declined to the record low value of 661 t in 2008. The quality of the commercial landings and catch-at-age data for this stock deteriorated in the 1990s following reductions in the TAC without associated control of fishing effort. Legislation introduced in Britain and Ireland in 2006 has reduced misreporting.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data. Reported landings are replaced by estimates derived from a port sampling scheme for the years 1991-1999. From 2000 the model estimates the removals needed for abundance estimates to follow the same trends as observed by surveys in the area.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are $B_{pa}=10,000$ t, $F_{pa}=0.72$

STOCK STATUS:

Based on the most recent estimates of SSB (in 2009), ICES classifies the stock as having reduced reproductive capacity. Based on the most recent estimates of fishing mortality (in 2008), ICES classifies the stock as being harvested unsustainably. The spawning-stock biomass has declined ten-fold since the late 1980s and has had reduced reproductive capacity since the mid-1990s. Recruitment has been below average for the past seventeen years, and the seven most recent year-classes are amongst the smallest on record.

RECENT MEASURES TO PROMOTE STOCK RECOVERY: To rebuild the SSB of the stock, a spawning closure was introduced in 2000 for ten weeks from mid-February which was argued to maximize the reproductive output of the stock (EU Regulations 304/2000 and 549/2000). The measures were revised in 2001, 2002, 2003 and 2004, involving a continued, but smaller spawning ground closure, coupled with changes in net design to improve selectivity.

The EU has adopted a long-term plan for cod stocks and the fisheries exploiting those stocks (Council Regulation (EC) 1342/2008). This regulation repeals the recovery plans in Regulation (EC) No 423/2004, and has the objective of ensuring the sustainable exploitation of the cod stocks on the basis of maximum sustainable yield while maintaining a target fishing mortality of 0.4 on specified age groups.

The regulation is complemented by a system of fishing effort limitation (see EC 43/2009 for latest revision).

ICES has evaluated the management plan and found that all scenarios with the TAC constraints imposed ($\pm 20\%$) show very low probabilities of recovering the stock to Blim by 2015. ICES therefore considers the management plan not to be in accordance with the precautionary approach. If the TAC constraint is taken off, the chances of recovering the stock before 2015 increase significantly, although they remain low.

RECENT MANAGEMENT ADVICE:

ICES has evaluated the long-term management plan and found it not precautionary. Considering the options below, ICES continues to advise on exploitation boundaries in relation to precautionary limits and recommends that the fisheries for cod be closed until an initial recovery of the cod SSB has been proven. Any catches that are taken in 2010 will prolong the recovery to B_{pa} .

Exploitation boundaries in relation to existing management plans:

Given the highly uncertain estimates of fishing mortality resulting from the assessment, and the inability to attribute unaccounted removals from the assessment to fishery catches, non-fishery removals or other causes, it has not been possible to conduct a short-term forecast on the basis of the management plan. Given the stock status it is likely that the stock will fall into the category defined in Article 9.a of the plan which implies a 25% TAC reduction.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects:

Fishing mortalities between $F_{0.1}$ and F_{MAX} can be considered as candidate target reference points, consistent with taking high long-term yields and achieving a low risk of depleting the productive potential. The present fishing mortality is uncertain. However, the total mortality in excess of assumed natural mortality is estimated to be well above any candidate reference points for F .

Exploitation boundaries in relation to precautionary considerations:

Given the low stock size and recent poor recruitment, it is not possible to identify any non-zero catch which would be compatible with the precautionary approach.

STECF COMMENTS:

STECF agrees with the ICES advice that on the basis of exploitation boundaries in relation to precautionary considerations, there should be no fishing on Cod in Division VIIa. STECF further notes the considerable problems with the assessment for this stock. STECF believes that the bias and uncertainty in the assessment are being exacerbated by the deterioration in availability and reliability of catch and effort data although the recent implementation of stricter landings enforcement has potentially improved the quality of the landings data from 2006 onwards.

STECF notes that this stock is subject to the provisions of the long-term management plan for cod (Council Regulation (EC) 1342/2008) but also that this plan has been evaluated as not precautionary with respect to the VIIa cod stock.

STECF notes that the stock is outside safe biological limits and according to the Commissions Communication on Fishing opportunities for 2010 (COM (2009) 224) cod in VIIa can be classified as a category 3 stock. STECF further notes that given the background of the latest scientific assessment and advice and with reference to COM (2009) 224) cod in VIIa can be classified as a category 10 stock.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (Council Regulation (EC) 1342/2008).

STECF notes that this plan has been evaluated to be inconsistent with the precautionary approach for cod in area VIIa. Nevertheless, STECF notes that according to the agreed management plan the TAC for 2010 should be set at 674 t.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that cod in VIIa can be classified under Categories 3 and 10.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 3	NE*	Outside Safe Biological limits (but STECF unable to advise on TACs linked to forecast F).

Category 10 ≤ 674 t PA (advice for zero catch), $\geq 25\%$ reduction in TAC

*NE- not estimable

4.3. Cod (*Gadus morhua*) in areas VIIe-k

FISHERIES: Cod in Divisions VIIe-k are taken as a component of mixed trawl fisheries. Landings are made mainly by French gadoid trawlers, which prior to 1980 were mainly fishing for hake in the Celtic Sea. Landings peaked in 1989 at 20,000 t and have since been maintained at between 3,500 and 13,000 t except for 2005-06 where landings fell to just above 3,000 t (the lowest level in the time series). All landings are taken by EU fleets.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

Current management measures for Divisions VIIe-k also apply to cod in Divisions VIIbc and cod in Division VIId. Similarly the TAC is set for Divisions VIIb-k, Subareas VIII, IX, X, and CECAF 34.1.1. Within this larger area there is no control over where the catches are taken.

The assessment area covers Divisions VIIe-k and the ICES advice applies to these areas only, while Cod in Division VIId is assessed together with cod in the North Sea (the assessment of the stock in Division VIId is combined with that of Sub-area IV and IIIa).

The TAC for Division VIIa is based on a separate assessment for that Division and has a separate TAC.

If it is necessary to calculate a TAC for Sub-area VII - excluding Divisions VIIa and VIId - and including Subareas VIII, IX and X, then 1,000 t representing the average catches from the non-assessed areas should be added to the proposed TAC for Divisions VIIe-k.

PRECAUTIONARY REFERENCE POINTS: The proposed reference points for fishing mortality and biomass are $F_{pa} = 0.68$, $B_{pa} = 8,800$ t.

STOCK STATUS: The available information on landings, cpue, surveys, and stock structure are inadequate to establish reliable assessments and evaluate stock trends. Therefore the state of the stock is unknown and there is no basis for quantitative advice.

The stock is highly dependent on incoming recruitment levels. More than 50% of the stock abundance was composed of age 2 during the last four years. The total mortality estimated from the surveys does not show any trends other than a fluctuation within the span of the uncertainty. Survey data indicate weak year-classes in 2002, 2003, and 2004 in line with the catch data. This was followed by slightly better recruitment in 2005, 2006, and 2007. These are below average compared with the time-series.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of precautionary considerations that fishing effort and catches should be reduced although it is not possible to determine the appropriate scale of such reduction.

The displacement of effort from areas with existing effort control regimes (Division VIIa, Subareas VI and IV) would have a detrimental effect on measures to reduce the mortality of cod in the Celtic Sea.

The most pertinent changes to the fishing pattern for cod have been the increased high-grading and discarding in response to restrictive quotas since 2002. High-grading has occurred in French fisheries since 2003 and was also apparent in UK fisheries since 2007.

This stock has had a truncated age structure observed in the landings over many years. The historical dynamics of Celtic Sea cod have been "recruitment driven", i.e. the stock increased in the past in response to good recruitments and decreased rapidly during times of poor recruitment. Recruitment in recent years appears to be poor. Fishing mortality should be reduced in the longer term to maximize the contributions of recruitment to future SSB and yield and will result in reduced risk to the stock.

STECF COMMENTS:

STECF considers that because there is no quantitative advice and spawning stock biomass in relation to precautionary limits is unknown there is no basis on which to give advice.

STECF **recommends** that given the apparent poor state of the cod stock in VIIe-k and potential displacement of effort from areas with existing effort control regimes a long-term management plan, which includes provision for stock recovery should be developed and implemented.

STECF concludes that with the background of the latest ICES advice and based on the Commissions Communication on Fishing opportunities for 2010 (COM (2009) 224), cod in VIIe-k would be classified as a Category 11 stock. Further, for stocks classified in categories 6 to 9 Annex III of (COM (2009) 224) applies and because an abundance estimate is not available rule 4 of Annex III applies. The fishing opportunities for 2010 for this category is given below.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that cod in VIIe-k can be classified under Category 11.

Accordingly STECF notes that the rule for this category implies the following for the TAC in 2010.

	2010 TAC	Basis
Category 11	4,183t	No STECF advice, recent catch level (3-year average)

4.4. Haddock (*Melanogrammus aeglefinus*) in Division VIIa (Irish Sea)

FISHERIES: The haddock stock is mainly confined to the western Irish Sea where important mixed-species fisheries for *Nephrops*, whiting and cod take place. A directed fishery developed for haddock during the 1990s. Large catches of haddock are taken in the *Nephrops* fishery during periods of high haddock abundance. A directed fishery for mature haddock in spring, using pelagic trawls and whitefish otter trawls, has been curtailed since 2000 by the cod spawning closure. Fishing effort of these vessels has been redirected to surrounding regions, and some vessels switched to using *Nephrops* trawls to take advantage of the derogation for *Nephrops* fishing during the closure. The current directed fishery for haddock in the Irish Sea is likely to generate by-catches of cod in the same area. Between 1984 and 1995 landings ranged from about 400 t to 1,750 t and then increased to 3,000 t in the late 1990s. Landings have since declined to about 674 t in 2003, remained at that low level until 2006 but rose to approximately 1,000 t in 2007. Official landing reports may substantially underestimate the true removal by the fishery although legislation introduced by the UK and Ireland has potentially improved the quality of landings data in 2006 and 2007. Discard sampling levels have increased in recent years. The highly variable and very large estimates of discarding for this fishery that have been observed previously are still evident.

Due to the by-catch of cod in the haddock fishery, the regulations affecting Division VIIa haddock remain linked to those implemented under the Irish Sea cod recovery plan. The extent to which fishing mortality may have been reduced in 2005 by management measures such as effort limitation and decommissioning of vessels in 2003 could not be reliably evaluated.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. An assessment was carried out based on survey information only and is considered to be indicative of trends only. Both total mortality and SSB estimates are relative as survey catchabilities at age are not known.

PRECAUTIONARY REFERENCE POINTS: There are no biomass reference points defined for this stock. The proposed precautionary fishing mortality reference point is $F_{pa} = 0.50$.

STOCK STATUS: The state of the stock is uncertain. Stock trends indicate an increase in SSB over the time-series but a decrease in 2008. Recruitment in the last two years appears to be below average. Total mortality appears relatively stable.

As recent levels of catch are uncertain the assessment carried out was based on survey trends and is, consequently, considered to be indicative of trends only. Overall the perception of the stock has not changed since last year's assessment.

- Both total mortality and SSB estimates are relative as survey catchabilities at age are not known.
- Although the relative SSB estimate for 2009 is still above the series average, the SSB is expected to decrease further due to two successive years of below average recruitment. The most recent SSB estimate indicates that the stock has declined since last year.
- The survey estimate of biomass is projected to decline.
- Additional recruitment survey indices indicate that the recruitment estimates for the last two years might be lower than estimated by the current survey based assessment.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of precautionary considerations that there should be no increase in effort relative to 2009.

Further ICES consider the current TAC management measures as being 'not responsive enough considering the dynamic nature of changes in stock abundance. The TAC has been restrictive in 2007 and became exhausted in the third quarter for some member states. ICES advises no increase in effort. Under the assumption of constant effort, the increase in abundance from 2005-2008 created increased catch opportunities. During this period the TAC remained relatively constant and resulted in increased discarding of older fish (particularly in 2007). The TAC for 2009 was increased based on the increasing trend of stock abundance, in spite of evidence of weaker recruitment and possible decreasing abundance'.

STECF COMMENTS: STECF agrees with the advice from ICES: the state of the stock is uncertain, and, on the basis of precautionary considerations, there should be no increase in effort relative to 2009.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, Haddock in Division VIIa can not be classified under any of the categories listed.

4.5. Haddock (*Melanogrammus aeglefinus*) in Division VIIb-k (Celtic Sea and West of Ireland)

FISHERIES: In this area, haddock is taken in mixed fisheries along with cod, whiting, plaice, *Nephrops*, sole and rays. Most catches come from otter trawlers, mainly from France and Ireland. The TAC has not been restrictive for haddock. Landings peaked at about 11,000 t in 1997 and have fluctuated between about 5,000 t and 8,000 t since then. In 2008, total ICES estimated (preliminary) landings amounted to 7,013t from an estimated total catch of 16,467 tonnes.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No fishing mortality or biomass reference points have been established for this stock.

STOCK STATUS: The state of the stock is uncertain.

The new landings, lpue and survey data available for this stock do not change the perception of the stock and do not give reason to change the advice from 2008. The advice for the fishery in 2010 is therefore the same as the advice given in 2008 for the 2009 fishery: "*Future catches and SSB will be highly dependent on the strength of incoming year-classes and their discard mortality. No strong recruitment has been observed since 2002 and*

estimated recruitment for 2006 is the lowest since 1997. In this context the stock should be managed by ensuring that fishing effort is not allowed to increase.”

Additionally ICES notes that large numbers of haddock under the minimum landing size of 30 cm are caught and discarded. Due to high levels of discarding, the fleets have not been able to benefit from the increased biomass that follows strong recruitment. Catches more than doubled from 2006 to 2008.

RECENT MANAGEMENT ADVICE: The advice is the same as last year: ICES advises, on the basis of precautionary considerations, that there should be no increase in effort relative to 2009. Future catches and SSB will be highly dependent on the strength of incoming year-classes and their discard mortality. No strong recruitment has been observed since 2002 and estimated recruitment for 2006 is the lowest since 1997. In this context the stock should be managed by ensuring that fishing effort is not allowed to increase.”

STECF COMMENTS: STECF agrees with the advice given by ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, Haddock in Division VIIb-k can not be classified under any category.

4.5.1. Special request on Haddock VII b-k

STECF is requested to explain the statements made on recent recruitment levels. It is not clear whether recruitment trend is good, bad or none of those.

STECF notes that the most recent information on recruitment trends for haddock in Divisions VIIb-k is given in the ICES advice for 2008 (ICES advice 2007, Book V), which indicates that while recruitment appears to have varied over time without any clear trend, recruitment in 2006 is one of the lowest in the time series (1993-2006 inclusive). STECF did not have any data relating to recruitment of haddock in Divisions VIIb-k for years after 2006.

4.6. Saithe (*Pollachius virens*) in Div's VII, VIII, IX, X

No stock assessment of saithe is conducted in this area.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Saithe in Subareas VII, VIII, IX, X can be classified under Category 11.

Accordingly STECF notes that the rules for each of the above category imply the following option for the TACs for 2010.

	2010 TAC	Basis
Category 11	NE*	No STECF advice. Recent catch level with 15% constraint on TAC change
*NE- not estimable		

STECF did not have access to information on the recent level of catches for saithe in these areas and is therefore unable to advise on the TAC for saithe in Subareas VII, VIII, IX, X corresponding to the rule for Category 11 stocks.

4.7. Whiting (*Merlangius merlangus*) in VIIa (Irish Sea)

FISHERIES: Whiting is taken mainly as a by-catch in mixed-species otter trawl fisheries for *Nephrops*, cod, and other demersal species. Landings of whiting by all vessels, and discards of whiting estimated for *Nephrops*

fisheries, have declined substantially. From 1989 to 2006, reported landings declined from 11,300 t to less than 100 t. Reported landings in 2008 were 80 t. Only EU vessels exploit the stock, with the UK and Ireland accounting for the majority of the landings, with very smaller quantities landed by Belgium and France. Due to the low value of the catch, a high proportion of whiting are discarded. Reports of significant non-reported landings indicate that the current implementation of the TAC system is not able to restrict fishing.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The last analytical assessment was undertaken in 2003. Since then analytical assessment has not been possible because of low and unreliable catch figures and because of poor consistency in the survey results.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.65$, $B_{pa} = 7,000$ t.

STOCK STATUS Long-term information on the historical yield and catch composition all indicate that the present stock size is low. Survey information indicate a decline in SSB.

RECENT MANAGEMENT ADVICE: On the basis of the stock status ICES advises that catches of whiting in 2010 should be the lowest possible.

The advice on the exploitation of this stock is presented in the context of mixed fisheries in the Irish Sea and is found in Section 3.2.

STECF COMMENTS: STECF agrees with the advice from ICES that catches should be the lowest possible. STECF notes that the high level of discard and non-reported landings indicates that the current TAC and quota system is inefficient in regulating fishing mortality. STECF therefore **recommends** that the TAC system is supplemented with enhanced control measures to reduce unreported landings and measures reducing discards. STECF is currently not in the position to provide advice on concrete measures to reduce discards and **recommends** that such measures are developed in close cooperation between the fishing sector, managers and scientists

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Whiting in VIIa can be classified under Category 10.

Category 10 STECF advises a reduction to the lowest possible level.

	2010 TAC	Basis
Category 10	≤ 157 t	The TAC should be reduced by at least 25%. Recovery measures should be implemented including effort reductions and introduction of more selective fishing gear

4.8. Whiting (*Merlangius merlangus*) in VIIb-k

There is a mismatch between management area and assessments units. Whiting in VIIe-k is assessed as one stock, VIId whiting are included in the North Sea whiting and whiting from b--c is not included in any assessment.

FISHERIES: Celtic Sea whiting are taken in mixed fisheries along with cod, whiting, hake, *Nephrops*. French trawlers account for about 60% of the total landings, Ireland takes about 30%, and the UK (England and Wales) 7%, while Belgian vessels take less than 1%. Catch levels peaked in the late nineties with over 23,000 t reported by ICES and subsequently declined to less than 10,000 t in 2006. Catches in 2008 were less than 6000t.

There is substantial discarding above the minimum landing size due to economic or other factors.

Management regulations, particularly effort control regimes in other areas (VIIa, VI, & IV), became increasingly restrictive in 2004 and 2005 and resulted in a displacement of effort into the Celtic Sea.

Since 2005, ICES rectangles 30E4, 31E4, and 32E3 have been closed during the first quarter (Council Regulations 27/2005, 51/2006, 41/2007 and 40/2008) with the intention of reducing fishing mortality on cod. The effects of the closure on whiting are not known although there have been spatial and temporal changes in the distribution of effort.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. Advice is based on an exploratory assessment, which is indicative of trends only. Discarding is considered to be significant and the assessment does not include discard information.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for biomass is $B_{pa} = 21,000t$. No precautionary reference point for fishing mortality has been proposed for whiting in VIIb-k.

STOCK STATUS: The available information is inadequate to evaluate the spawning stock in relation to precautionary approach reference points. The stock is estimated to have declined in recent years as the strong 1999 year-class passed through the fishery. There are some indications that recent recruitment has been stable at low levels. Fishing mortality was very high during the 1980s and decreased in the early 1990s; the estimates of recent fishing mortality are variable.

RECENT MANAGEMENT ADVICE:

The new exploratory assessment available for this stock does not change the perception of the stock and does not give reason to change the advice from 2008.

The advice on this stock for the fishery in 2010 is therefore the same as the advice given in 2008 for the 2009 fishery: *“The current estimates of fishing mortality and SSB are uncertain, but SSB shows a decreasing trend while recruitment has been low in recent years, although the 2007 year-class is above average, and the 2008 year-class may be very strong. In order to reverse the trend in SSB, ICES considers that fishing mortality should be reduced. However, ICES cannot quantify the required reduction in fishing mortality.”*

STECF COMMENTS: STECF agrees with the advice from ICES that fishing mortality should be reduced.

In addition STECF notes that (according to ICES) surveys indicate the 2007 and 2008 year-classes may be strong and therefore management measures should be introduced in the Celtic Sea to reduce discarding of these year-classes in order to maximize its contribution to future yield and SSB.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Whiting in VII b-k can be classified under Category 7.

Category 7 State of the stock not known precisely and STECF to reduce fishing effort.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 7	14,410t	State of the stock is unknown, reduce fishing mortality, 15% reduction in TAC

4.9. Anglerfish (*Lophius piscatorius* & *Lophius budegassa*) in Div. VII

Anglerfish within the two management areas VII and VIII a,b,d,e are assessed together and comprise of two species (*Lophius piscatorius* & *Lophius budegassa*) which are not always separated for market purposes. The management area for this stock also includes the Irish Sea (VIIa) where catches since 1995 have been between about 300t and 1,300 t, (330 t officially reported in 2007). These catches are not included in the assessment.

FISHERIES: The trawl fishery for anglerfish in the Celtic Sea and Bay of Biscay developed in the 1970s. Anglerfish are also taken as a by-catch in other demersal fisheries in the area. Landings of both species have fluctuated over the last 20 years. Landings of *L. piscatorius* have declined steadily from 23 700 t in 1986 to 12 800 t in 1992, then increased to 22 100 t in 1996 and declined to 14 900 t in 2000. The landings have increased since then reaching the maximum of the time series in 2007 (29 700 t). In 2008, landings were 24,600t. Landings of *L. budegassa* have fluctuated all over the studied period between 5 700 t to 9 600 t with a succession of high (1989-1992, 1998 and 2003) and low values (1987, 1994 and 2001). The total estimated landings for 2008 is 7,500 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. Lacking an analytical assessment the advice is based on survey data and catch information.

PRECAUTIONARY REFERENCE POINTS As a consequence of recently identified problems with growth estimates, previous reference points are not considered to be valid. Reference points will have to be redefined based on an approved analytical assessment.

STOCK STATUS:

Lophius piscatorius

The state of the stock is unknown. It has not been possible to quantify SSB, fishing mortality, and recruitment for this stock. However, survey data (biomass and abundance indices, length distribution) give indication that the biomass has been increasing as a consequence of the good recruitment observed in 2001, 2002, and 2004 and has stabilized in recent years. There are evidences of good recruitment in 2008.

Lophius budegassa

The state of the stock is unknown. It has not been possible to quantify SSB, fishing mortality, and recruitment for this stock. However, survey data give indication that the biomass has shown a continuous increase since the mid-2000s as a consequence of several good incoming recruitments. There is good evidence of a strong incoming recruitment from 2008 data.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of precautionary considerations that the effort in fisheries that catch anglerfish should not be allowed to increase

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that ICES advice is based on recent effort due to concerns about the accuracy of landings in recent years and increased discarding rates

The management area for this stock also includes the Irish Sea (VIIa) but the catches of the Irish Sea are not included in the assessment.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, Anglerfish in Division VII can not be classified under any of the categories listed..

4.10. Megrim (*Lepidorhombus whiffiagonis* and *Lepidorhombus boscii*) in VII and VIIIabde.

Megrim in management areas VII and VIIIabde are assessed as a single stock.

FISHERIES: Megrim to the west of Ireland and Britain and in the Bay of Biscay are caught predominantly by Spanish and French vessels, which together have reported more than 60% of the total international landings, and by Irish and UK demersal trawlers. Megrim is mostly taken in mixed fisheries for hake, anglerfish, *Nephrops*, cod, and whiting. Over the period 1984 to 2003, annual catches as estimated by ICES have been between 15,500 t to 21,800 t. In 2005 and 2006, catches dropped to 14,500 t. In 2007, catches were at 15,600 t. In 2008, catches decreased again to 12,700 t. Discards have been estimated to vary between 1,100 t and 5,400 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.30$, $B_{pa} = 55,000$ t.

STOCK STATUS: The state of the stock is unknown. It has not been possible to quantify SSB, fishing mortality, and recruitment for this stock. However, surveys and commercial data indicate that the stock has been rather stable over the time-series.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to precautionary considerations that there should be no increase in effort of fisheries that catch *L. whiffiagonis* in 2010

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF notes that the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, Megrim in Division VII can not be classified under any of the categories listed.

4.11. Megrim (*Lepidorhombus whiffiagonis* and *Lepidorhombus boscii*) in VIIb-k and VIIa,b,d.

The stocks summary for megrim in Divisions VIIb-k and VIIa,b,d are given in Section 3.10.

4.12. Plaice (*Pleuronectes platessa*) in Division VIIa (Irish Sea)

FISHERIES: Plaice are taken mainly in long-established UK and Irish otter trawl fisheries for demersal fish. They are also taken as a by-catch in the beam trawl fishery for sole. The main fishery is concentrated in the northeast Irish Sea. Catches are predominantly taken by the UK, Belgium and Ireland, with smaller catches by France and at the end of the 1990s by The Netherlands. Landings were sustained between 2,900 t and 5,100 t from 1964-1986. Landings declined from the 1987 peak of 6,200 t to between 1,100-1,500 t from 1999-2005, well below the agreed TAC. Landings in 2008 are the lowest in the time series at 534 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial landings data and three scientific surveys.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.45$, $B_{pa} = 3,100$ t.

STOCK STATUS: Based on the most recent estimate of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and being harvested sustainably. The SSB in 2009 was well above B_{pa} . Fishing mortality on this stock has been declining since the late 1980's and has been below F_{pa} since 1998.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of high long-term yield that catches should not exceed 1,627t in 2010

STECF COMMENTS: STECF agrees with the advice for VIIa plaice.

STECF notes that the assessment is based on catch-at-age analysis with CPUE series from both commercial fleets and surveys, but no discard information is included.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Plaice in Division VIIa can be classified under Category 1.

Accordingly STECF notes that the rule for the above category implies the following options for TACs in 2010.

	2010 TAC	Basis
Category 1	1,627t	Stock exploited at maximum sustainable yield

4.13. Plaice (*Pleuronectes platessa*) in the Celtic Sea (Divisions VIIf and g)

FISHERIES: The fishery for Celtic Sea plaice involves vessels from France, Belgium, England and Wales and Ireland. In the 1970s, the VIIfg plaice fishery was mainly carried out by Belgian beam trawlers and Belgian and UK otter trawlers. Effort in the UK and Belgian beam-trawl fleets increased in the late 1980s but has since declined. Recently, many otter trawlers have been replaced by beam trawlers, which target sole. Landings increased in the late eighties to its record high (2100t) and have declined since.

Currently the main fishery occurs in the spawning area off the north Cornish coast, at depths greater than 40 m, about 20 to 25 miles offshore. Although plaice are taken throughout the year, the larger landings occur during February–March after the peak of spawning, and again in September. Recent increases in fuel costs are thought to have restricted the range of some fleets and may have resulted in a reduction in effort in Divisions VIIIf,g.

Since 2000 the estimated landings have been below the TACs, and lowest catch levels of 389 t were recorded in 2005. Nevertheless, according to the catch forecast the predicted landings in 2009 (at status quo fishing mortality) are 36% higher than the agreed TAC for 2009.

Plaice in the Bristol Channel and Celtic Sea (ICES Divisions VIIIf and VIIIg) is managed by TAC and technical measures. Technical measures in force for this stock are minimum mesh sizes, minimum landing size, and restricted areas for certain classes of vessels. Technical regulations regarding allowable mesh sizes for specific target species, and associated minimum landing sizes, came into force on 1 January 2000. The minimum landing size for plaice in Divisions VIIIf,g is 27 cm.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on landings, one survey index, and two commercial CPUE series. There is a retrospective bias of overestimation of SSB and underestimation of fishing mortality. Recent forecasts for this stock have been overly optimistic.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are F_{pa} = not defined, B_{pa} = 1,800 t.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009), ICES classifies the stock as having reduced reproductive capacity. SSB peaked in 1988–1990, following a series of good year-classes, then declined rapidly and has since 2002 been below or around Blim. Fishing mortality has fluctuated around an average level (0.60) for the entire time-series but has declined since 2004. Recruitment was relatively high in most years during the 1980s, but has been lower since then. Some very weak year-classes have occurred since the late 1990s.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of exploitation boundaries in relation to precautionary considerations that a 50% reduction in F is needed to increase SSB to around B_{pa} in 2011. This corresponds to landings of less than 330t in 2010.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: The current fishing mortality (2008) is estimated at 0.37, which is above the range that would lead to high long-term yields and low risk of stock depletion.

Exploitation boundaries in relation to precautionary considerations: A 50% reduction in F is needed to increase SSB to around B_{pa} in 2011. This corresponds to landings of less than 330 t in 2010.

Since 2005, ICES rectangles 30E4, 31E4, and 32E3 have been closed during the first quarter (Council Regulations 27/2005, 51/2006, and 41/2007) with the intention of reducing fishing mortality on cod. There is evidence that this closure has redistributed effort to other areas. Fishing mortality has decreased since 2005, and the closure may have been one of the contributing factors

Discard rates are high for this stock in some seasons/fleets. The high level of discarding indicated in this mixed fishery would suggest a mismatch between the mesh size employed and the size of the fish landed. Increases in the mesh size of the gear should result in fewer discards and in increased yield from the fishery. The use of larger-mesh gear should be encouraged in this fishery in instances where mixed fishery issues allow for it.

STECF COMMENTS: STECF agrees with the ICES advice.

Furthermore, STECF notes that adopting a target F in the range $F=0.14$ to $F=0.28$ for Celtic Sea plaice is desirable whilst also take into account the interactions with Celtic Sea sole.

Discard rates are believed to be high for this stock and their non-inclusion in the analysis may represent a major deficiency in the assessment, particularly if there have been changes in discarding practices over time.

The high level of discarding indicated in this mixed fishery would suggest a mis-match between the mesh size employed and the size of the fish landed. Increases in the mesh size of the gear should result in fewer discards

and, ultimately, in increased yield from the fishery. The use of larger mesh gear should be encouraged in this fishery in instances where mixed fishery issues allow for it.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Plaice in Divisions VII_{fg} can be classified under Category 3.

Accordingly STECF notes that the rule for the above category implies the following options for TACs in 2010.

	2010 TAC	Basis
Category 3	450 t	Aim to set the TAC to the forecast catch that will result in a 30% reduction in fishing mortality rate, but do not reduce the TAC by more than 20% as long as fishing mortality will not increase. Limiting landings in 2010 450 t.

4.14. Plaice (*Pleuronectes platessa*) in Divisions VII_e (Western English Channel)

FISHERIES: The fisheries taking plaice in the Western Channel mainly involve vessels from the bordering countries: the total landings (2008) are split among UK vessels (80%), France (12%), and Belgium (8%). Landings of plaice in the Western Channel were low and stable between 1950 and the mid-1970s, and increased rapidly during 1976 to 1988 as beam trawls began to replace otter trawls, although plaice are taken mainly as a by-catch in beam-trawling directed at sole and anglerfish. Estimated landings have been fairly stable since 1994. Landings decreased in 2008 (974 t.) to a similar low level as in the late-1970s. The main fishery is south and west of Start Point. Although plaice are taken throughout the year, the larger landings are made during February, March, October, and November

The TAC for plaice in the English Channel is set for Divisions VII_{d,e} combined.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial and survey data.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.45$, $B_{pa} = 2,500t$.

STOCK STATUS: Based on the most recent estimate of SSB (in 2009) ICES classifies this stock as being at risk of reduced reproductive capacity. SSB has been declining since 2000 and is now close to B_{lim} . Based on the most recent estimate of F (in 2008) ICES classifies this stock as being at risk of being harvested unsustainably. Fishing mortality has shown an increase in recent years but this may be due to the retrospective bias. Fishing mortality remained above F_{pa} since the late 1980s

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of exploitation boundaries in relation to precautionary limits. This corresponds to a substantial reduction in catch until SSB is above B_{pa} or other strong evidence of rebuilding is observed.

Other considerations:

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: Fishing mortalities in the range of $F_{0.1} = 0.12$ to $F_{MAX} = 0.26$ can be considered as candidate target reference points, which are consistent with taking high long-term yields and achieving a low risk of depleting the productive potential. The recent fishing mortality is well above these potential fishing mortality targets.

Exploitation boundaries in relation to precautionary limits: Given the low stock size, recent poor recruitment, high fishing mortality, the uncertainty in the assessment, and the inability to reliably forecast catch, ICES recommends a substantial reduction in catch until the estimate of SSB is above B_{pa} or other strong evidence of rebuilding is observed.

STECF COMMENTS: STECF agrees with the advice from ICES.

STECF notes that plaice in VIId and VIIe are managed by a joint TAC and that the advice from ICES is radically different for the two stock components; “No increase above the average of landings from the last three years (2006–2008), corresponding to landings less than 3 500 t” for plaice in VIId and “a substantial reduction in catches” for plaice in VIIe.

STECF also notes that the advice, based on exploitation boundaries in relation to precautionary limits requires a substantial reduction in catches whereas application of the appropriate rule in the Communication from the Commission (COM (2009) 224) does require a reduction in TAC of 15% according to category 9 rule 2.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that plaice in subarea VIIe can be classified under Category 9 rule 2.

Accordingly STECF notes that the rules for the above category imply the following option for TACs in 2010.

2010 VIIe TAC component		Basis
Category 9	828 t	State of stock not known precisely and STECF advises the stock is decreasing, hence 15% reduction.

STECF further notes that the result of applying the rules of Annex II of COM (2009) 224 to both separate components result in a joint TAC for plaice in VIId,e of no greater than $3,500 \text{ t} + 828 \text{ t} = 4,328 \text{ t}$ (See also section 2.18).

4.15. Plaice (*Pleuronectes platessa*) in VIIhjk

FISHERIES: Ireland, UK, France and Belgium are the major participants in this fishery. Plaice are predominantly caught within mixed species otter trawl fisheries in Division VIIj.

Official landings have declined from 790 t in 1998 to 135 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment for this stock in 2002 was preliminary. In 2007 the data were screened and updated but no new analytical assessment was carried out.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The available information is inadequate to evaluate the state of the stock. Landings have decreased continuously since the beginning of the time-series. However, the new data available do not change the perception of the stock and do not give reason to change the advice from 2007.

RECENT MANAGEMENT ADVICE: The new data available for this stock (landing and sampling) do not change the perception of the stock. Based on precautionary approach and considering that exploratory estimates suggest that the current fishing mortality is greater than F_{MAX} ,

“ICES advice that there should be a reduction in catches in 2010 until there is more information to facilitate an adequate assessment.”

STECF COMMENTS: STECF agrees with the ICES advice. However since current F is estimated to be above F_{MAX} , it is likely that a reduction in fishing mortality is required to achieve MSY . STECF therefore advises that fishing effort on plaice in Divisions VIIh-k should be reduced.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that plaice in subarea VIIh-k can be classified under Category 7.

2010 TAC		Basis
Category 7	218t	State of the stock unknown advice for effort reduction, Annex III, Rule 1

4.16. Plaice (*Pleuronectes platessa*) in Division VIIb,c

FISHERIES: Ireland is the major participant in this fishery with around 90% of the international landings between 1993-2006. Plaice are normally caught in mixed species otter trawl fisheries in Division VIIb. These vessels mainly target other demersal fish species and *Nephrops*. Official landings have declined from 251t in 1996 to 30t in 2007.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No fishing mortality or biomass reference points are defined for this stock.

STOCK STATUS: The available information is inadequate to evaluate the state of the stock. Landings show a declining trend in recent years with a record low of 30t in 2006, rising to 35t in 2008. The new data available do not change the perception of the stock and do not give reason to change the advice from 2007.

RECENT MANAGEMENT ADVICE:

The available information is insufficient to evaluate stock trends. However, exploratory estimates of mortality suggest that the current fishing mortality is greater than F_{MAX} . This together with a reduction in recent landings leads to an advice to reduce TAC to recent average landings (2006-2008) of less than 33 t.

STECF COMMENTS: STECF agrees with the advice from ICES. The exploitation of this stock should be conducted in the context of mixed fisheries protecting stocks outside safe biological limits.

STECF notes that the proposed TAC is unlikely to constrain the fishery as the landings in recent years are below the advised landings and agreed TAC's.

However since current F is estimated to be above F_{MAX} , it is likely that a reduction in fishing mortality is required to achieve MSY . STECF therefore advises that fishing effort on plaice in Divisions VIIb,c should be reduced.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that plaice in subarea VIIb,c can be classified under Category 7.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	80 t	State of the stock not known, advice for effort reduction, Annex III rule 1

4.17. Sole (*Solea solea*) in Division VIIa (Irish Sea)

FISHERY: Sole are taken mainly in a beam trawl fishery that commenced in the 1960s and are also taken as a by-catch in the long established otter trawl fisheries. Effort in the Belgian beam trawl fleet increased in the late 1980s as vessels normally operating in the North Sea were attracted into the Irish Sea by better fishing opportunities. In recent years, however, catch rates of sole have been low in the Irish Sea, and part of the beam trawl fleet has moved to other sole fishing grounds. Over the last 30 years, the total landings have been in the order of 1,000 t to 2,000 t. Landings in 2006, 2007 and 2008 were 570 t and 490 t and 330t respectively.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment which uses commercial landings data and two scientific surveys.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.30$, $B_{pa} = 3,100$ t. The biomass reference point was revised in 2007 as the SSB estimates have been rescaled.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as suffering reduced reproductive capacity and at risk of being harvested unsustainably. SSB

has declined since 2001 to low levels and reached the lowest level in 2008. Fishing mortality has been close to or above F_{lim} throughout most of the time-series. Fishing mortality has decreased in recent years and is estimated to be just above F_{pa} in 2008. Recent recruitment levels have been lower than earlier in the time-series, with the last three years of recruitment being the lowest in the series.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of exploitation boundaries in relation to precautionary limits that no fishing of sole should take place in the Irish Sea in 2010.

Other considerations:

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: Fishing mortality is estimated to be above $F_{0.1} - F_{pa}$ (0.15-0.30).

Exploitation boundaries in relation to precautionary limits: Given the low SSB and low recruitment since 2000, it is not possible to identify any non-zero catch, which would be compatible with the precautionary approach. ICES recommends a closure of the fishery in 2010 and a recovery plan should be developed and implemented as a prerequisite to reopening the fishery.

STECF COMMENTS: STECF agrees with the ICES advice for VIIa sole.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Sole in Division VIIa can be classified under Category 10.

Category 10 STECF advises a zero catch, a reduction to the lowest possible level or similar advice.

Accordingly STECF notes that the rules for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 10	≤ 377 t	The TAC should be reduced by at least 25%. Recovery measures should be implemented including effort reductions and introduction of more selective fishing gear

4.18. Sole (*Solea solea*) in Divisions VIIIf,g (Celtic Sea)

FISHERIES: The sole fishery is concentrated on the north Cornish coast off Trevoze Head and around Lands End. Reported landings have generally declined since the mid 1980s, up to 1998. Since then they increased to around 1,300 t in the early 2000's. Landings in 2008 were 800 t.

Sole are taken mainly in a beam trawl fishery that started in the early 1960s and, to a lesser extent, in the longer established otter trawl fisheries. In the beam trawl fishery sole is mainly taken as part of a mixed demersal fishery with plaice and, to a lesser extent, cod. Both of the latter stocks require a reduction in fishing mortality.

In the 1970s, the fishery was mainly carried out by Belgian beam trawlers and Belgian and UK otter trawlers. The use of beam trawls (to target sole and plaice) increased during the mid-1970s, and the Belgian otter trawlers have now been almost entirely replaced by beam trawlers. Effort in the Belgium beam trawl fleet increased in the late 1980s as vessels normally operating in the North Sea were attracted to the west by improved fishing opportunities. Beam trawling by UK vessels increased substantially from 1986, reaching a peak in 1990 and decreasing thereafter. In the Celtic Sea, the beam and otter trawl fleets also take other demersal species such as plaice, cod, rays, brill, turbot, and anglerfish.

Currently the fisheries for sole in the Celtic Sea and Bristol Channel involve vessels from Belgium, taking around 65%, the UK around 25%, France around 5% and Ireland also around 5% of the total landings.

The Celtic Sea is an area without days-at-sea limitations for demersal fisheries. In the past this has resulted in increased effort in the Celtic Sea as a direct result of restrictive effort in other areas. This was particularly the case in 2004–2005 when effort in the sole fishery increased because of restrictive days at sea in the eastern channel (Division VIId).

SOURCE OF MANAGEMENT ADVICE: The advice is based on an analytical age-based assessment using landings, two commercial cpue series, and one survey index.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.37$, proposed $B_{pa} = 2,200$ t. There are no specific management objectives for this stock.

STOCK STATUS: Based on the most recent estimates of SSB and fishing mortality, ICES classifies the stock as having full reproductive capacity and being harvested sustainably. The most recent estimate of fishing mortality is slightly above F_{MAX} . The 2007 year-class is estimated to be strong.

RECENT MANAGEMENT ADVICE:

ICES advises that there is no long-term gain in yield to increase fishing mortality. ICES therefore recommends limiting landings in 2010 to no more than 920t.

Other considerations:

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: The current fishing mortality (2008) is estimated to be 0.27, which is slightly above the rate expected to lead to high long-term yields and low risk of stock depletion.

Exploitation boundaries in relation to precautionary limits: F should be kept below F_{pa} , corresponding to landings of less than 1185 tonnes in 2010. This is expected to keep the stock above B_{pa} .

Comparison with previous assessment and advice: The general trends in the estimates of the stock numbers, fishing mortality, and recruitment are similar to those of the previous assessment. The current assessment has revised the value of SSB in 2007 upwards by 5%. The perception of the fishing mortality in 2007 was revised downwards by 7%. Recruitment in 2007 was revised downwards by 40%.

The advice last year was based on no increase in F because there is no long-term gain in increasing fishing mortality. The basis for the advice this year is the same.

Regulations and their effects: Since 2005, ICES rectangles 30E4, 31E4, and 32E3 have been closed during the first quarter (Council Regulations 27/2005, 51/2006, 41/2007 and 40/2008) with the intention of reducing fishing mortality on cod. The effects of the closure on sole are not known although there have been spatial and temporal changes in the distribution of effort.

Changes in fishing technology and fishing patterns

Beam trawlers account for the majority of the vessels targeting sole. High fuel costs contributed to a reduction in effort in Division VIIIf,g in 2008. In addition, several vessels of this fleet segment are developing methods to reduce fuel costs.

STECF COMMENTS: STECF agrees with the advice from ICES.

STECF notes that effort restrictions are in place for many areas but not in the Celtic Sea, which makes the latter vulnerable to unrestricted increases in effort. This is undesirable where stocks are already overexploited.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Sole in VIIIfg can be classified under Category 2.

Accordingly STECF notes that the rules for the above category implies the following options for TACs in 2010.

	2010 TAC	Basis
Category 2	920t	Overexploited compared to F_{msy} but inside safe biological limits

4.19. Sole (*Solea solea*) in Division VIIe (Western English Channel).

FISHERIES: Total landings reached a peak in the early 1980s, initially because of high recruitment in the late 1970s and later because of an increase in exploitation. In recent years, English vessels have accounted for around 60% of the total landings, with France taking approximately a third, and Belgian vessels the remainder. UK landings were low and stable between 1950 and the mid-1970s, but increased rapidly after 1978 due to the replacement of otter trawlers by beam trawlers.

Sole are widespread and usually taken in conjunction with other species to varying degrees, dependent on location and season. The most productive sole fishery grounds are located close to ports, while the highest catches of anglerfish for example are taken further south and west in Division VIIe.

The principal gears used are otter-trawls and beam-trawls, and sole tends to be the target species of an offshore beam-trawl fleet, which is concentrated off the south Cornish coast and also catches plaice and anglerfish. The total landings have been stable over 1991-1999 and amounts to around 900 t. Since 2000, landings have been around 1,050 with the 2008 landings of 904 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Analytical assessment based on landings, survey and commercial CPUE data.

PRECAUTIONARY REFERENCE POINTS: There are no proposed precautionary reference points for this stock but an EC multiannual plan has been implemented (Council Regulation (EC) 509/2007 of 7 May 2007)

STOCK STATUS: Precautionary reference points established in 2001 for this stock are no longer valid and there is no accepted assessment.

Survey, lpue, and the exploratory assessment suggest low stock size and high fishing mortality relative to historic estimates.

MANAGEMENT AGREEMENT: Council Regulation (EC) No. 509/2007 establishes a multi-annual plan for the sustainable exploitation of Division VIIe sole. The management plan adopted to reduce fishing mortality and increase SSB in this stock cannot be evaluated in the absence of a full analytical assessment or biological reference points.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of exploitation boundaries in relation to precautionary considerations that fishing effort and catches should be reduced, although it is not possible to determine the appropriate scale of such reductions.

STECF COMMENTS: STECF notes that in the absence of an accepted analytical assessment, current F is not well estimated. However, in response to a specific request from the Commission, STECF was able to provide additional information on fishing opportunities for VIIe sole for 2010. The request and the STECF response are given below.

Request to STECF on fishing opportunities for 2010 for sole in Division VIIe.

BACKGROUND

Based on the most recent assessment and advice from STECF and according to ANNEX II of the Commission's Communication on fishing opportunities for 2010 (COM(2009) 224) the stock of sole in ICES Division VIIe can be classified as a category 7 stock. The decision rule for category 7 stocks states that the TAC should be reduced by up to 15% and STECF should be asked to advise on the appropriate level of effort.

REQUEST TO STECF

Taking into account the above background, STECF is requested to advise on the most appropriate TAC for VIIe sole in 2010 that is likely to be consistent with achieving sustainable exploitation with a fishing mortality target of $F=0.27$.

STECF RESPONSE

STECF notes that the objective of the management agreement for VIIe sole (Council Regulation (EC) No. 509/2007) is to achieve and maintain fishing mortality at a rate of 0.27 on appropriate age groups. In part 1 of its review of advice for 2010 for stocks of Community interest and based on the most recent assessment information from ICES on sole in VIIe, STECF concluded that in the absence of any estimate of the recent level

of fishing mortality or stock size, STECF is unable to estimate the catch that corresponds to the management plan harvest rule

In response to the current request STECF carried out a simple catch curve analysis based on commercial catch data. The results indicate that total mortality (Z) since 2002 appears to have been on average in the region of $Z = 0.42$. Assuming that the natural mortality (M) for VIIe sole is 0.1, this implies that on average, fishing mortality (F) in recent years has been about $F = 0.32$. Hence to achieve a target fishing mortality rate of $F = 0.27$ in 2010, would imply a reduction in fishing mortality of about 15 % over recent average levels.

STECF therefore advises that if the objective for managers is to achieve $F = 0.27$ in 2010, fishing mortality on VIIe sole in 2010 should be reduced by about 15%. STECF notes that according to Article 5 of the management agreement for sole in VIIe (Council Regulation (EC) No. 509/2007), this implies that the permitted numbers of days at sea for the vessels to which Article 5 applies, should be reduced by 15%.

With regard to the most appropriate TAC that corresponds to a fishing mortality rate of $F = 0.27$, this cannot be deduced with the available data and information.

In order to reduce any immediate negative economic impacts on the fleets that exploit sole in VIIe through loss of fishing opportunities, STECF proposes that managers adopt a pragmatic approach to reduce fishing mortality towards the target rate of $F = 0.27$ through stepwise annual reductions in fishing effort until the target is reached. In the absence of a reliable relationship between fishing mortality and fishing effort, STECF suggests a 1:1 ratio be assumed. The magnitude of the annual reductions required depends on the speed at which managers wish to achieve the objective of $F = 0.27$.

STECF has insufficient information available at this point in time to compare the estimated economic impact on the fishing fleet of a single large cut in effort with a more stepwise reduction in effort over a few years. However, a more stepwise reduction of fishing days is likely to allow the fleet to adjust to the new regime over time.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (Council Regulation (EC) 509/2007).

STECF notes that this plan has not yet been evaluated or the evaluation was inconclusive with respect to the precautionary approach. In the absence of any estimate of the recent level of fishing mortality or stock size STECF is unable to estimate the catch that corresponds to the management plan harvest rule.

4.20. Demersal elasmobranchs in the Celtic and Irish Seas

Previous stock summaries and advice on demersal elasmobranchs has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice for demersal elasmobranchs in the Celtic and Irish Seas. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for demersal elasmobranchs in the Celtic and Irish Seas was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Sections 6.1 and 6.6 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

4.21. Herring (*Clupea harengus*) in the Irish Sea (Division VIIa)

FISHERIES: This fishery is mainly exploited by the UK with Ireland taking a small proportion of the catches in some years. Since 1987 the landings have fluctuated between about 2,000 t and 10,000 t. Catches in 2008 were 4,900 t which is slightly higher than 2007 when 4,600 t were landed. Since 2002 the agreed TAC has been 4,800 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The exploratory assessment of the stock is based on survey data and catch-at-age data. The assessment is not considered accurate with respect to recent F and SSB, but it is indicative of trends and levels in the past.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for biomass is $B_{pa} = 9,500$ t, $B_{lim} = 6,000$ t. F_{pa} is not defined.

STOCK STATUS: Based on the most recent estimates of SSB and fishing mortality ICES classifies the state of the stock as uncertain. SSB is unknown but thought to be stable at a low level. It seems likely that the stock has been relatively stable for the last 10 years.

RECENT MANAGEMENT ADVICE:

The new landings and survey data available for this stock do not change the perception of the stock and do not give reason to change the advice from 2008. The advice for the fishery in 2010 is therefore the same as the advice given for the 2009 fishery: “SSB is unknown but thought to be stable at a low level. The recent TACs do not appear to have been detrimental to the stock”.

Other considerations:

In addition, ICES offers the following consideration: The stock identity is complex as the juveniles mix with those of the Celtic Sea and the adults migrate from the Irish Sea after spawning. The stock identity has been reviewed by an EU-funded project WESTHER. Therefore, the assessment and advisory framework for this stock is currently being reviewed. Results of this work are expected to be available for the ICES advice in 2010.

This advice will be updated in 2011.

STECF COMMENTS: STECF notes that the state of the stock is not known precisely. It notes the advice from ICES, which it interprets as meaning that catches in 2010 should not exceed 4,800 t. However STECF suggests the TAC should be reduced by not more than 15% leading to catches of 4080t in 2010.

STECF notes the ICES consideration regarding the results of the EU-funded project WESTHER which have shown that the herring populations in this area and in VIaS, VIIb,c, and VIaN form a metapopulation. In 2008 ICES began to evaluate management for this metapopulation. In the meantime, each population will continue to be managed separately.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Herring in Division VIIa can be classified under Category 6.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	4,800t	State of the stock is not known, advice on appropriate catch level

4.22. Herring (*Clupea harengus*) in the Celtic Sea (VIIg and VIIa South), and in VIIj Division VIIg,h,j,k

FISHERIES: France, Germany, Ireland, Netherlands and UK have participated in the herring fisheries in this area. However in recent years the fishery has mainly been exploited by Irish vessels and Ireland has been allocated nearly 90% of the overall quota. Until the late nineties, landings fluctuated between about 19,000 and 23,600 t. From 1998 to 2008, landings decreased from 20,300 to just above 6800 t. The fishery exploits a stock, which is considered to consist of two spawning components (autumn and winter). The stock is exploited by two types of vessels, larger boats with Refrigerated Sea Water (RSW) storage, and smaller dry hold vessels. The smaller vessels are confined to the spawning grounds (VIIaS and VIIg) during the winter period. The RSW vessels target the stock inshore in winter and offshore during the summer feeding phase (VIIg). The number of vessels participating in the fishery has decreased in recent years. However, efficiency has increased, especially in the RSW vessels. An increasing proportion of the catch is now being taken by RSW vessels and lower amounts by dry-hold vessels. There has been little fishing in VIIj in recent seasons, and there is evidence that stock abundance in this area is currently low.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The current management regime has resulted in catch data, which are thought to be reasonably reliable in recent years. The assessment is based on catch-at-age data and acoustic survey data. There is no recruitment index available for this stock. There was no quantitative assessment in 2008. Hence, the levels of SSB and F in the most recent year are indicative of trends only. However, it is clear that there are low abundances of older fish both in the catches

and the population. Also, it is clear that SSB has declined since the mid-1990s. In a fishery that is based on only a few age classes, this is a cause for concern as there may be a high risk to the reproductive capacity of the stock from such a series of events.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference point for biomass is $B_{pa} = 44,000$ t, $B_{lim} = 26,000$ t. No precautionary fishing mortality reference point has been defined. F_{mgt} has been set at 0.19 in the management plan.

STOCK STATUS: The stock SSB is increasing and based on the most recent estimates (in 2008/2009) ICES classifies the stock as having full reproductive capacity. An analytical assessment demonstrates that F in 2008/2009 has substantially reduced to the lowest rate in 45 years, and is below $F_{0.1}$. There is evidence of two good recruitments and three poor recruitments in recent years.

MANAGEMENT AGREEMENT:

The Irish Celtic Sea Herring Management Advisory Committee was established to manage the Irish fishery for this herring stock. This Committee manages the Irish quota and implements measures in addition to the EU regulations. The committee proposed a rebuilding plan in 2008. The TAC for 2009 was set by the Council accordingly. This plan has not been formally agreed yet and implies fishing at $F_{0.1}$ (In 2007: 0.19, in 2008/2009=0.17).

Rebuilding Plan Proposed by the Celtic Sea Management Advisory Committee, Ireland, for this stock.

1. For 2009, the TAC shall be reduced by 25% relative to the current year (2008).
2. In 2010 and subsequent years, the TAC shall be set equal to a fishing mortality of $F_{0.1}$.
3. If, in the opinion of ICES and STECF, the catch should be reduced to the lowest possible level, the TAC for the following year will be reduced by 25%.
4. Division VIIaS will be closed to herring fishing for 2009, 2010 and 2011.
5. A small-scale sentinel fishery will be permitted in the closed area, Division VIIaS. This fishery shall be confined to vessels, of no more than 65 feet length. A maximum catch limitation of 8% of the Irish quota shall be exclusively allocated to this sentinel fishery.
6. Every three years from the date of entry into force of this Regulation, the Commission shall request ICES and STECF to evaluate the progress of this rebuilding plan.
7. When the SSB is deemed to have recovered to a size equal to or greater than B_{pa} in three consecutive years, the rebuilding plan will be superseded by a long-term management plan.

ICES has evaluated the plan and considers it is precautionary within the estimated stock dynamics. If a sequence of low recruitments takes place then the harvest control rule may have to be reevaluated.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of exploitation boundaries in relation to existing management plans that fishing mortality in 2010 could be increased to 0.19 corresponding to catches of 10,150t.

Other considerations:

Exploitation boundaries in relation to existing management plans

Following the proposed rebuilding plan implies catches of 10 150 t in 2010, which is expected to lead to SSB of 58 000 t in 2011.

Exploitation boundaries in relation to high long-term yield

Fishing at $F_{mgt}=0.19$ is consistent with high long-term yield and low risk to stock biomass.

Exploitation boundaries in relation to precautionary limits

No catch option less than 13 100 t in 2010 would bring SSB below B_{pa} .

STECF COMMENTS: STECF agrees with the ICES advice.

STECF notes that the stock is subject to a new rebuilding plan which has been evaluated by ICES and is deemed precautionary within the estimated stock dynamics.

STECF notes that the application of this rebuilding plan results in a 71% increase in TAC, corresponding to an increase of 4250 tonnes.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed management plan the TAC for 2010 should be set at 10,150 t.

4.23. Herring (*Clupea harengus*) in Division VIIe,f

FISHERIES: This stock is exploited by the UK and France. The TAC for this stock has been set at 1,000 t and has remained unchanged in recent years. This TAC is divided equally between the UK and France. Landings have fluctuated over the last ten years, from a low of 176 t to a high of 1,040 t. In 2004, 2005 and 2006 catches have been around 700 t. Catches in 2007 were around 500 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No analytical assessment has been made in recent years.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS The available information is inadequate to evaluate stock trends, and the state of the stock is uncertain.

RECENT MANAGEMENT ADVICE: No management advice is provided for this stock.

STECF COMMENTS: No comments.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Herring in Division VIIef can be classified under Category 11.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 11	850 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint???

4.24. Sprat (*Sprattus sprattus*) in Divisions VIIId,e.

FISHERIES: Only the UK carries out a sprat fishery in this area. For the last 20 years the annual landings have been in the order of 1,200 to 5,400 t. Landings have decreased since 1999. Landings in 2004 were the lowest in the time series, at about 800 t. Slight increases in landings were seen in 2005 and 2006 with about 1,600 t and 2,000 t reported respectively. Landings in 2008 were around 3400 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. There have been no attempts to undertake an assessment and in 2009 ICES once again consider that insufficient data are available to carry out an assessment.

PRECAUTIONARY REFERENCE POINTS: There are no reference points for this stock.

STOCK STATUS: the state of this stock remains unknown. Sprat is a short-lived species with natural fluctuations in stock biomass.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: No comments

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM (2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Sprat in VIIdc can be classified under Category 11.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 11	5,223 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint????

5. Resources in Southwestern waters

5.1. Norway lobster (*Nephrops norvegicus*) in Southwestern waters

Norway lobster in Divisions VIII, IX and IX contains 4 Functional Units:

- Divisions VIIIa, b: Bay of Biscay North and south (FU 23 & FU 24)
- Divisions VIIIc: North Galicia (FU 25) and Cantabrian Sea (FU 31)

Of the 4 *Nephrops* FUs in ICES div. VIII the *Nephrops* in Bay of Biscay (FUs 23 and 24) is the major contributor to *Nephrops* landings from this area. All the fisheries in VIII taking *Nephrops* are mixed fisheries, in which a single target species often may be difficult to identify. A major fin-fish component is hake. None of these 4 FUs are assessed by UWTV surveys. At present only FUs 23 and 24 are subject to analytical assessments. These *Nephrops* FUs are assessed by the ICES Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk and Megrim (WGHMM),

5.1.1. Norway lobster (*Nephrops norvegicus*) in FU 23 & FU 24, Bay of Biscay (Divisions VIIIa, b)

FISHERIES: There are two Functional Units in these divisions VIIIa & VIIIb: a) Bay of Biscay North (FU 23) and b) Bay of Biscay South (FU 24), together called Bay of Biscay. Nearly all landings are taken by French trawlers. Landings have fluctuated between 3,500 and 6,000 t during the time-series. These fluctuations may be explained by variability in recruitment. In 2008 total landings amounted to 3030 t. The corresponding estimated discards were 2123 t. Despite a decommissioning programme for French vessels, it is likely that effective effort has stabilised since 1994 or even increased due to increased gear efficiency.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Biennial advice (for 2009 and 2010) for this FU was provided in 2008. The advice is based on an (pseudo-)age-based assessment. Catch-at-age data are generated by slicing of sampled length distributions combined for males and females.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been defined for this stock.

STOCK STATUS: According to the 2008 assessment sawn biomass has been relatively stable over the entire period. The fishing mortality was above the F_{MAX} of 0.15. Recruitment showed a declining trend up to 1998, but seems to have recovered since then.

RECENT MANAGEMENT ADVICE: Since the SSB has been relative stable, the current landings can be maintained. The ICES advice for 2009 generally recommends not to increase effort and to restrict catches to the recent average value of 3,400 t (2006-2007 average).

STECF COMMENTS: STECF agrees with the advice from ICES. STECF also notes, that application of age based assessment methodology using slicing for creating pseudo-ages has been criticised by ICES. A main problem being that application of knife-edge slicing technique for creating pseudo ages may lead to biases in estimates of F.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that the *Nephrops* in Divisions VIIIa, b (FU 23 & FU 24) may be classified under Category 6

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 6	3400 t	State of stock not known precisely (biennial advice for 2009 and 2010).

5.1.2. Norway lobster (*Nephrops norvegicus*) in Division VIIIc (FU 25 & FU 31)

FISHERIES: There are two Functional Units in this Management Area: a) North Galicia (FU 25) and b) Cantabrian Sea (FU 31). All catches from these FUs are taken by Spain. *Nephrops* constitutes a small component of mixed fishery landings taken by bottom trawlers. Hake constitutes a main component of these landings. Landings and effort in both functional units have declined and landings are now at extremely low levels compared to earlier years (58 t in 2008) compared to landings of about 500 t in the early 1990s).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Biennial advice (for 2009 and 2010) for this FU was provided in 2008. Advice is based on landings data, LPUE data and trends in mean size for both FUs

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are defined for this stock.

STOCK STATUS: The trends in LPUE indicate low stock level in both stocks. Increasing mean size in catches indicate failing recruitment in both stocks.

RECENT MANAGEMENT ADVICE: Given the very low state of the stock, ICES advises zero catches in 2009 and 2010 for both stocks (FU 25 & FU 31).

There are explicit management objectives for southern hake and *Nephrops* under the EC Reg. No. 2166/2005 establishing measures for the recovery of the Southern hake and Norway lobster stocks in the Cantabrian Sea and Western Iberian Peninsula by January 2006. The aim of the recovery plan is to rebuild the stocks within 10 years, with a reduction of 10% in F relatively to the previous year and the TAC set accordingly. However, given the very low state of the stock, ICES advises a zero TAC for both FUs in this Management Area.

STECF COMMENTS: STECF agrees with the advice from ICES.

According to article 6 of the recovery plan the TACs for Norway lobster in Divisions VIIIc and IXa shall be set at a level that will result in the same relative change in its fishing mortality rate as the change in fishing mortality rate achieved for the hake stock. However, the changes in TAC shall be limited to no more than +/- 15 %.

The TAC advised by ICES for hake for 2010 consistent with the recovery plan is 9,300 t. This reflects an increase in the hake TAC of 15 % and if fully enforced, corresponds to a reduction in the fishing mortality on hake of about 50 % compared to the value of fishing mortality assumed by ICES for 2009.

The latest assessment of the five functional *Nephrops* units recognised in Divisions VIIIc and IXa conducted in 2006 does not include information allowing precise catch predictions. However, the information available indicates that a reduction in the fishing mortality on *Nephrops* of about 50 % would result in reduction in catches of more than 15 %. STECF therefore advises that the TACs for *Nephrops* in Divisions VIIIc and IXa consistent with the recovery plan should be set equal to 15 % reduction of the 2009 TACs.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (EC Reg. No. 2166/2005).

STECF notes that this plan has not yet been evaluated or the evaluation was inconclusive with respect to the precautionary approach. STECF therefore notes that the TAC corresponding to the relevant rule in the management plan is 95 t (15 % reduction of the 2009 TAC).

5.1.3. Norway lobster (*Nephrops norvegicus*) in Divisions VIII d, e

FISHERIES: There are no reported landings of *Nephrops* from this area

RECENT MANAGEMENT ADVICE: ICES has suggested that a zero TAC be set for this area to prevent misreporting.

STECF COMMENTS: STECF notes that the most recent information for this stock relates to the year 2002. The above text is unchanged from the STECF Review of Scientific advice on stocks of Community interest for 2004. STECF agrees with the advice from ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

STECF considers it is not appropriate to give a category to *Nephrops* in VIII d,e, since there are no reported catches from this area.

5.1.4. Norway lobster (*Nephrops norvegicus*) in Division IX and X.

FISHERIES: There are five Functional Units (FU) in Division IXa: a) West Galicia (FU 26), b) North Portugal (FU 27), c) Southwest Portugal (FU 28), d) South Portugal (FU 29), and e) Gulf of Cadiz (FU 30). There are no reported landings of *Nephrops* from Division IXb and Subarea X. These *Nephrops* FUs are assessed by the ICES Working Group on the Assessment of Southern Shelf Stocks of Hake, Monk and Megrim (WGHMM),

Nephrops represents a small, but valuable by-catch in these fisheries targeting mainly demersal fish species. In the Southwest and South SW and S Portugal there is a crustacean trawl fishery, targeting mainly deepwater crustaceans. The fishery in West Galicia, North Portugal and Gulf of Cádiz is mainly conducted by Spanish vessels, and that in Southwest and South Portugal by Portuguese vessels, on deep water grounds (200-750 m). The Portuguese fleet comprises two components: demersal fish trawlers and crustacean trawlers. Total landings from Div. IXa (FUs 26-30) have decreased dramatically during the last 30 years. In 1980 landings exceeded 2000 t, while they were 323 t in 2008, of which 208 t were taken from FU 28 and FU 29.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. Biennial advice (for 2009 and 2010) for these FUs was provided in 2008. The advice for the stocks in FUs 26 and 27 (West Galicia and North Portugal), and FU 30 (Gulf of Cadiz) was based on trends in LPUE data and data on mean size, while the advice for the stocks in FU 28 and FU 29 (Southwest and South Portugal) was based on an (pseudo-) age-based assessment using catch-at-age data generated by slicing of sampled length distributions (combined for males and females).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been defined for these stocks.

STOCK STATUS: West Galicia (FU 26) and North Portugal (FU 27): The available information indicates that the stocks are at a very low level of abundance in SW and S Portugal (FU 28 & FU 29): Stock status is uncertain, but appears to have recovered from its low level in 1996 to almost the level of the mid-1980s in 2002 and has been relatively stable since then.

Gulf of Cadiz (FU 30): State of the stock is unknown, but abundance has been stable in recent years.

RECENT MANAGEMENT ADVICE: FUs 26–27: These stocks are at an extremely low level. Mean sizes and previous assessments (2006) indicated that the stocks suffer a progressive recruitment failure. ICES advises no fishing on *Nephrops* until there is evidence of stock improvement.

FUs 28–29: these stocks appear to have recovered from its low level in 1996 to almost the level of the mid-1980s by 2002 and have been relatively stable since then. The average landings during the period when the stock was recovering (1996–2002) was about 200 t. Therefore, ICES advises that landings in 2009 should not exceed 200 t.

STECF COMMENTS: STECF agrees with the advice from ICES. According to article 6 of the recovery plan the TACs for Norway lobster in Divisions VIIIc and IXa shall be set at a level that will result in the same relative change in its fishing mortality rate as the change in fishing mortality rate achieved for the hake stock. However, the changes in TAC shall be limited to no more than $\pm 15\%$.

The TAC advised by ICES for hake for 2009 consistent with the recovery plan is 8,104 t. This reflects an increase in the hake TAC of 15 % and if fully enforced, corresponds to a reduction in the fishing mortality on hake of more than 50 % compared to the value of fishing mortality assumed by ICES for 2008.

The latest assessment of the five functional *Nephrops* units recognised in Divisions VIIIc and IXa conducted in 2006 does not include information allowing precise catch predictions. However, the information available indicates that a reduction in the fishing mortality on *Nephrops* of about 50 % would result in reduction in catches of more than 15 %. STECF therefore advises that the TACs for *Nephrops* in Divisions VIIIc and IXa consistent with the recovery plan should be set equal to 15 % reduction of the 2008 TACs corresponding to a TAC in 2009 for *Nephrops* in IX, X and EC waters of CECAF 34.1.1 of 353 t.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (EC Reg. No. 2166/2005).

STECF notes that this plan has not yet been evaluated or the evaluation was inconclusive with respect to the precautionary approach. STECF therefore notes that the TAC for *Nephrops* in IX, X and EC waters of CECAF 34.1.1 corresponding to the relevant rule in the management plan is 318 t (15 % reduction of the 2009 TAC).

5.2. Hake (*Merluccius merluccius*) in Divisions VIIIc, IX and X (Southern hake)

FISHERIES: This stock is exploited in a mixed fishery by Spanish and Portuguese trawlers and artisanal fleets. Landings fluctuated between 6,700 and 35,000 t (1972–2005) and in 2008 were 10,200 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial CPUE series and survey data. The assessment excludes the Gulf of Cadiz. Discards are not included in the assessment, but preliminary estimates are approximately 3000 tonnes in 2008, representing approximately 20% of the total landings

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points are B_{pa} : 35,000 t, F_{pa} : 0.4. Precautionary reference points for B_{lim} and F_{lim} are 25,000 t and 0.55 respectively.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009), ICES classifies the stock as suffering reduced reproductive capacity. Based on the most recent estimate of fishing mortality (in 2008) ICES classifies the stock as at risk of being harvested unsustainably. Fishing mortality has increased in recent years and is currently near F_{lim} . SSB and recruitment have increased in recent years, but recruitment in 2008 is lower than in previous years and estimated to be poor (the lowest in the 27-year time series).

MANAGEMENT OBJECTIVES: There are explicit management objectives for southern hake and *Nephrops* established under the EC Reg. No. 2166/2005 establishing measures for the recovery of the Southern hake and Norway lobster stocks in the Cantabrian Sea and Western Iberian Peninsula by January 2006. The recovery plan has the objective of bringing the spawning stock biomass of hake above 35 000 tonnes within 10 years and to reduce fishing mortality to 0.27. The main elements in the plan are a 10% annual reduction in F and a 15% constrain on TAC change between years.

ICES have not yet evaluated the plan. However, preliminary evaluation of the recovery plan indicated that the proposed level of F might be insufficient to rebuild the stock within 10 years.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the exploitation boundaries in relation to precautionary limits that landings for 2010 should not exceed 4 900 t.

Other considerations:

Exploitation boundaries in relation to existing management plans

According to the recovery plan, the reduction in F of 10% would result in a TAC increase greater than 15%. Therefore, landings in 2010 should not exceed 9 300 t, corresponding to a 15% increase of the 2009 TAC.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects

The status quo fishing mortality is estimated at 0.52, well above levels that could support sustainable long-term yield ($F_{MAX} = 0.18$).

Exploitation boundaries in relation to precautionary limits

For SSB to reach a B_{pa} in 2011 an F of 0.13 in 2010 should be applied. The corresponding yield (including Gulf of Cadiz) is 4.9 thousand tonnes in 2010.

STECF COMMENTS: STECF agrees with the ICES advice.

STECF notes that the agreed TAC is consistently overshoot, and fishing mortality is increasing. STECF therefore **recommends** that measures to ensure compliance with the agreed TAC and effort restrictions be put in place as a matter of urgency. STECF also **recommends** that the measures currently in place to recover the hake stock in Divisions VIIIc and IXa, should be extended to include all fisheries that exploit hake in these areas.

STECF further notes that a preliminary evaluation of the recovery plan indicated that even the agreed target level of F (0.27) might be insufficient to rebuild the stock within 10 years.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (EC Reg. No. 2166/2005).

STECF notes that this plan has not yet been evaluated or the evaluation was inconclusive with respect to the precautionary approach. STECF therefore notes that the TAC corresponding to the relevant rule in the management plan is 9,300 t.

5.3. Whiting (*Merlangius merlangus*) - VIII

STECF did not have access to any stock assessment information on whiting in this area.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that whiting in Subarea VIII can be classified under Category 11

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 11	3,060 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint????

5.4. Whiting (*Merlangius merlangus*) - IX, X

STECF did not have access to any stock assessment information on whiting in this area.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that whiting in Subareas IX and XI can be classified under Category 11

	2010 TAC	Basis
Category 11	555 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

5.5. Anglerfish (*Lophius piscatorius* and *Lophius budegassa*) in Div's VIIIa, b, d, e

Anglerfish within the two management areas VII and VIII abde are assessed together and comprise of two species (*L. piscatorius* and *L. budegassa*), which are not always separated for market purposes. Details of stock status and advice are given in Section 3.9.

5.6. Anglerfish (*Lophius piscatorius* and *Lophius budegassa*) in VIIIc, IX, X

FISHERIES: Anglerfish in the Iberian region are caught as part of a mixed demersal fishery by vessels using trawls and fixed nets. Two species (*L. piscatorius* and *L. budegassa*) are caught and they are not always separated for market purposes so the advice is combined for the two stocks. Landings of (*L. piscatorius*) decreased from 6,900t in 1986 to about 790t in 2001. Landings have increased to 3,600 t in 2005 and decreased to 2,300 t in 2007 and 2008. For *L. budegassa* landings decreased from 3,700t in 1988 to 800 t in 2002 but have increased in recent years. In 2007 they were estimated at 1,300 t. They decreased again in 2008 to 950 t

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. In 2009, a surplus production model (ASPIC) was used to provide estimates of stock biomass and fishing mortality relative to their respective maximum sustainable yield (MSY) values. No assessment was performed in 2008.

PRECAUTIONARY REFERENCE POINTS Precautionary reference points have not been defined for these stocks. FMSY could be considered as a candidate for a reference point consistent with high long-term yield.

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be evaluated in relation to these. The assessment is only considered indicative of stock trends and provides relative measures of stock status.

Biomass (in 2009) of *L. piscatorius* is estimated to be below BMSY and despite the decrease in fishing mortality since 2005, F (in 2008) is still above FMSY. The fishing mortality in 2008 is estimated to be 1.6 times higher than FMSY.

Fishing mortality for *L. budegassa* shows a decreasing trend since 1999 and in 2008 is below FMSY. This has led to an increase in biomass but in 2009 it is still below BMSY.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects. In order to reach BMSY the 2010 catches should be zero or a management plan should be developed. The advice accounts for the poor condition of *L. piscatorius* stock.

Other considerations:

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects

L. piscatorius fishing mortality equal to zero is not expected to bring the stock to BMSY until 2013.

L. budegassa fishing mortality equal to F status quo is expected to bring the stock to BMSY in 2011.

STECF COMMENTS: STECF notes that both stocks are caught together in most fisheries and managed under a common TAC, and that the advice depends on the stock in the poorer condition

STECF notes that anglerfish in VIIIc and IXa are caught in the same fisheries as hake and *Nephrops*. The provisions of the management plan for hake and *Nephrops* are not being enforced and its objectives are not being met.

To ensure recovery of anglerfish in VIIIc and IXa, it is essential that the provisions of the management plan for hake and *Nephrops* are fully implemented and enforced. Failure to do so may severely compromise any

recovery of the stock. STECF therefore **recommends** that enforcement of the provisions of the management plan for hake and *Nephrops* is given high priority and that measures to ensure compliance with the TAC for anglerfish and effort restrictions are put in place as a matter of urgency.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that anglerfish in VIIIc, IX, X would be categorised as being overfished with respect to the fishing mortality that will deliver maximum sustainable yield (Rule1, annex III). Accordingly, a 15% reduction in TAC in 2010 (1,500 t for combined stocks), would generate more than a 37% increase in SSB in both anglerfish stocks between 2010 and 2011. However the advice is to reduce catches to zero which means that Anglerfish in Division VIIIc, IX and X can be classified under Category 10

	2010 TAC	Basis
Category 10	≤ 1,320 t	The TAC should be reduced by at least 25%. Recovery measures should be implemented including effort reductions and introduction of more selective fishing gear

5.7. Megrim (*Lepidorhombus whiffiagonis*) in VIIIa,b,d,e.

Megrim in Divisions VIIIa,b,d,e are assessed together with megrim in Sub area VII (Section 3.10).

5.8. Megrim (*Lepidorhombus whiffiagonis* & *Lepidorhombus boscii*) in VIIIc, IX & X

FISHERIES: Megrim in the Iberian region are caught as a by-catch in the mixed bottom trawl fisheries by Portuguese and Spanish vessels and also in small quantities by the Portuguese artisanal fleet. Two species (*Lepidorhombus whiffiagonis* & *L. boscii*) are caught and they are not usually separated for market purposes and a combined advice is provided for the two stocks. Changes in the demersal fisheries in recent years have reduced the fishing effort on megrim. Landings of *L. whiffiagonis* and *L. boscii* declined from 1986 to record low levels in 2002. Landings of both stocks have increased slightly since then and reached 930 t for *L. boscii* and 180 t for *L. whiffiagonis* in 2008.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES.

STOCK STATUS: In the absence of defined precautionary reference points, the state of the two stocks cannot be evaluated with regard to these. SSB of both species has decreased since the late 1980s. However, SSB for *L. boscii* shows a slightly upwards trend after reaching a minimum in 2001. For both species fishing mortality has decreased since the late 1990s. Recent recruitment for *L. boscii* has been below average. For *L. whiffiagonis* recruitment has been low in the last decade.

RECENT MANAGEMENT ADVICE:

Last year the advice was based on precautionary considerations. This year, ICES advises on the basis of exploitation boundaries in relation to high-long-term yield and low risk of depletion of the production potential that combined catches of *L. whiffiagonis* and *L. boscii* should not exceed 900 t.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects

2008 fishing mortality for *L. whiffiagonis* estimated at 0.20, is above $F_{0.1} = 0.17$.

2008 fishing mortality for *L. boscii* estimated at 0.23, is above $F_{0.1} = 0.18$.

Fishing at $F_{0.1}$ in 2010 is predicted to generate SSBs in 2011 that are 6-10% higher than in 2010 for the two megrim stocks.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Megrim in VIIIc, IX & X can be classified under Categories 6.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	1,200	STECF advice on catch level (15% limit on TAC variation).

5.9. Plaice (*Pleuronectes platessa*) in VIII, IX and X.

No information is available to STECF on these stock(s).

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that plaice in VIII, IX and X can be classified under Category 11

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	381 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

5.10. Sole (*Solea solea*) in Divisions VIIIa,b (Bay of Biscay)

FISHERIES: The French fixed net fishery for sole (largely in the spawning season) has increased over the assessment period, from less than 5% of landings prior to 1985, to around 90% in the recent years and this has resulted in an improvement of the selection pattern. Landings by Belgium beam trawlers increased rapidly in the late 1980s and since 1991 have been relatively constant at 8% of the total. For the last 15 years the total landings have varied from about 4,000 t to 7,300 t. The catches were 4,300 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

The advice is based on an age-based analytical assessment based on landings and CPUE data series from surveys and commercial fleets. Partial discard information is available from 1984 to 2003, but is no longer included in the assessment since 2004 because of the low contribution of discards to the catch and therefore to the assessment. No recruitment indices are available for this stock.

STECF also notes that there is a need for fisheries independent data to improve the stock assessment and the estimation of recruitment. This assessment relies on time series of commercial fleets. In addition, the proportion of landings taken by these fleets is decreasing. Commercial data do not provide reliable estimates of incoming year-classes

Furthermore, different age reading methodology and age interpretation exists between nations involved in the fisheries.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality (revised in 2006) and biomass are $F_{pa} = 0.42$, $B_{pa} = 13,000$ t.

MANAGEMENT AGREEMENT: The EC regulation 388/2006 of 23 February 2006 has established a management plan, which set the objective of bringing the spawning stock biomass above 13,000 tonnes in 2008. The current estimate of the SSB from the most recent assessment is above that level.

According to article 3 of the multi-annual plan it is necessary for EU to decide on a long-term target fishing mortality. Fishing at F_{pa} in 2010 will keep SSB at current level.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) ICES classifies the stock as having the full reproductive capacity. Based on the most recent estimates of fishing mortality (in 2008), ICES classifies the stock as being harvested sustainably. The most recent estimates of SSB are above B_{pa} . The most recent estimates of fishing mortality are below F_{pa} . Recruitment has been stable since 1993

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of exploitation boundaries in relation to precautionary considerations that landings for 2010 should not exceed 4 900 t.

Other considerations:

Exploitation boundaries in relation existing management plans

The agreed management plan aims to bring SSB above 13 000 t in 2008 as a first step. This target has been reached since 2007. According to the multi-annual plan a target fishing mortality should be established by the EU.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects

Target reference points have not been agreed for this stock. The fishing mortality in 2008, estimated to be 0.38, is well above any candidates for reference points in the range of $F_{0.1}$ – F_{MAX} .

Exploitation boundaries in relation to precautionary limits

F should be kept below F_{pa} . Applying F_{pa} in 2010 results in landings of 5 190 t in 2010, and generates an SSB in 2011 of 14 370 t, corresponding to a 2% decline compared with 2010.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes however that fishing at F_{pa} would imply that landings for 2010 should not exceed 5 190 t.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (EC regulation 388/2006).

STECF notes that this plan has not yet been evaluated or the evaluation was inconclusive with respect to the precautionary approach. STECF further notes that according to *article 3* of the multi-annual plan, when the spawning stock biomass is evaluated by ICES to be equal to or above the precautionary level of 13 000 tonnes, a target fishing mortality should be established by the Council. Until this is done the plan offers no practical guidance for managing the fishery

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that sole in Divisions VIIIa,b (Bay of Biscay) can be classified as Category 2 stock

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 2	4900t	Stock overexploited compared to msy but inside safe biological limits.

5.10.1. Special request on Sole VIIIa,b

STECF is requested to advise on a suitable target fishing mortality rate related to MSY as requested by the management plan (Article 3 of Council Regulation 388/2006), and advise on the consequences of setting TACs by gradual approximation to that rate of 10 % per year, or other appropriate value(s).

STECF response

STECF is unable to respond to this request at this time

5.11. Sole (*Solea* spp.) - VIIIcde, IX, X

STECF did not have access to any stock assessment information on sole in this area.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that sole in VIIIc,d,e, IX and X can be classified under Category 11

	2010 TAC	Basis
Category 11	1,034 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

5.12. Rays and skates in ICES Subareas VIII and IX

Previous stock summaries and advice on skates and rays has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice for ICES Subareas VIII and IX. Furthermore, ICES has not issued any new advice since 2008. The most recent advice incorporating skates and rays in the Subareas VIII and IX was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Section 6.1 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

5.13. Catsharks and Nursehounds (*Scyliorhinus canicula* and *Scyliorhinus stellaris*) in Subareas VIII, IX and X

Previous stock summaries and advice on catsharks and nursehounds has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice for Subareas VIII, IX and X. Furthermore, ICES has not issued any new advice since 2008. The most recent advice incorporating catsharks and nursehounds ICES Subareas VIII, IX and X was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Section 6.1 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

5.14. Tope (*Galeorhinus galeus*) in ICES Subareas VIII, IX and X

Previous stock summaries and advice on tope has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice for Subareas VIII, IX and X. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for tope was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Section 6.5 of this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

5.15. Other demersal elasmobranchs in the Bay of Biscay and Iberian Waters

Previous stock summaries and advice on demersal elasmobranchs has been provided at the NE Atlantic regional level and at present, STECF is unable to provide additional information and advice for the Bay of Biscay and

Iberian Waters. Furthermore, ICES has not issued any new advice since 2008. The most recent advice for demersal elasmobranchs was provided by STECF in its consolidated review of advice for 2009 and is reproduced in Section 6.1 this report. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

5.16. Anchovy (*Engraulis encrasicolus*) in Division VIII (Bay of Biscay)

FISHERIES: The fishery for anchovy in the bay of Biscay has been closed since 2005. Traditionally, anchovy in the bay of Biscay are mainly taken by pelagic trawlers and purse-seiners from France and Spain. The Spanish and French fleets fishing for anchovy in Subarea VIII are well separated geographically and in time. The Spanish fleet operates mainly in Division VIIIc and VIIIb in spring, while the French fleets operate in Division VIIla in summer and autumn and in Division VIIIb in winter and summer. There is fishing for anchovy throughout the year. The fishery is mostly dependent on the year-class recruiting at age 1. The estimated total catch in 2006 was 1,753 t. and the estimated catch in 2007 (only from experimental fisheries) amounted to 141 t. There were no catches up to June in 2008. This fishery has been managed by annual TACs, which have been set at a fixed level (in the range of 30,000 t to 33,000 t) independent of the advice (from 1979 to 2005). Since 2002, the total annual catches have been well below the fixed annual TAC indicating that when the recruitment is low, a management regime based on such annual TACs has not constrained the fishery.

SOURCE OF MANAGEMENT ADVICE: Annual advice on management is provided by ICES. The assessment is based on stock biomass estimates from egg (1987–2008) and acoustic surveys (1989–2008) and catches from the French and Spanish fisheries.

PRECAUTIONARY REFERENCE POINTS: ICES considers that B_{lim} is 21,000 t, the lowest observed biomass in the 2003 assessment, and proposed B_{pa} be set at 33,000 t. There is no biological basis for defining F_{lim} , and it is proposed that F_{pa} be established between $F=1.0$ and $F=1.2$. A B_{pa} reference point is difficult to use in management for this short-lived stock and the advice given by ICES is therefore not linked to this reference point.

Because the assessment provides the probability distributions for the SSB, it is possible to estimate directly the risk of the SSB falling below B_{lim} . B_{pa} and F_{pa} reference points may become unnecessary.

STOCK STATUS: Based on the most recent estimates of SSB, ICES classifies the stock as being at risk of reduced reproductive capacity. Although median SSB in 2009 is estimated to be above B_{lim} , this estimate has a 47% probability of being below B_{lim} . Low recruitment at age 1 since 2002 and almost complete recruitment failure of the 2004 year-class are the primary causes of the low stock size. The recruitment at age 1 in 2009 is at the same level as last year but lower than in 2006 and 2007.

RECENT MANAGEMENT ADVICE: There are no explicit management objectives for this stock. The present closure of the fishery aims at protecting the remaining stock until a strong year-class recruits to the stock. There is a 37% risk that SSB in 2010 will be below B_{lim} even with no catch. ICES advises on the basis of exploitation boundaries in relation to precautionary limits that the fishery should remain closed until the stock condition has improved. The stock condition can be re-evaluated when estimates of the 2010 SSB and 2009 year-class are available based on the spring 2010 acoustic and DEPM surveys. This implies a closure of the fishery until at least July 2010.

STECF COMMENTS:

STECF agrees with the ICES advice and notes that there have been large inter-annual fluctuations in recruitment, which are strongly dependent on environmental factors.

STECF further notes that there is a 37% risk that SSB in 2010 will be below B_{lim} even with no catch in 2009.

STECF recommendations:

- With the current poor stock situation, maximum protection of the remaining spawning population is required.
- STECF **recommends** that the Biscay anchovy fishery should remain closed until reliable estimates of the 2010 SSB and 2009 year-class, based on the results from the spring 2010 acoustic and DEPM surveys, become available. This implies closure of the fishery for anchovy in the Bay of Biscay (ICES Subarea VIII) until at least July 2010.

STECF stresses that any recovery is entirely dependent on good incoming recruitment. STECF also agrees with ICES that supplementary management measures (e.g. closed areas, minimum landing size) may be considered in addition to TACs

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that anchovy in VIII (Bay of Biscay) can be classified under Category 5

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2009/10 TAC	Basis
Category 5	0 t*	Short-lived species: In-year advice for zero catch

5.17. Anchovy (*Engraulis encrasicolus*) in Sub-area IX

This review relates to anchovy in Division IXa only.

FISHERIES: There is a regular fishery for anchovy in Division IXa South (Gulf of Cádiz). The fleets in the northern part of Division IXa occasionally target anchovy when abundant, as occurred in 1995. The anchovy in Subdivision IXa South has different biological characteristics and dynamics compared to anchovy in other parts of Division IXa. The anchovy population in Subdivision IXa South appears to be well established and relatively independent of populations in other parts of Division IXa. These other populations seem to be abundant only when suitable environmental conditions occur.

In 2000, catches in Division IXa South decreased, probably as a result of a large reduction in the fishing effort by the Barbate single-purpose purse-seine fleet, one of the main fleets harvesting anchovy in the area. Most of these vessels accepted a tie-up scheme in 2000 and 2001 because the EU Morocco Fishery Agreement was not renewed. Since 2002, these vessels have been fishing again in the Gulf of Cadiz. The effort exerted by the entire purse-seine fleet since 1997 has been high (even with a fishing closure in the 2004 fourth quarter). However, in 2005 and 2006, the possible combination of a new fishing closure in the fourth quarter and a reduction in the number of active vessels fishing anchovy (from 135 vessels in 2004 to 106 vessels in 2005 and only 99 vessels in 2006) led to a marked decrease in fishing effort. Such a decreasing trend seemed to have affected all the fleet segments in 2005, whereas in 2006 the reduction in the annual effort was only evident in the Barbate's home-based fleets. The total landings of anchovy in 2006 and 2007 were approximately 4,500 t and 6,500 t respectively. An important decrease in total landings was observed in 2008 (3,500t).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Analytical assessment of the stock is not possible at present.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been estimated for this stock.

STOCK STATUS: The information on this stock is inadequate to evaluate the spawning stock or fishing mortality relative to precautionary reference points, and the state of the stock is unknown.

RECENT MANAGEMENT ADVICE: The new landings, cpue, and survey data available for this stock do not change the perception of the stock and do not give reason to change the advice from 2007 and reiterated in 2008. The advice on this stock for the fishery in 2010 is therefore the same as the advice given in 2008 for the 2009 fishery: "Catches should be restricted to 4800 t (mean catches from the period 1988–2006 excluding 1995,

1998, 2001, and 2002, the years where catches were probably influenced by exceptionally high recruitment). This level should be maintained until the response of the stock to the fishery is known“.

Other considerations:

It is important that surveys are continued, in particular the spring acoustic survey and the recently initiated egg survey. It has not been possible to provide a reliable analytic assessment for this stock as a basis for management. A better alternative would be to consider management rules based directly on survey observations.

STECF COMMENTS: STECF agrees with the advice of ICES. STECF also considers that in-season management or alternative management measures (taking into account the data limitations) should be considered, due to fact that the stock experiences high natural mortality and is highly dependent upon recruitments.

STECF also agrees with the ICES consideration that it is important that surveys are continued, in particular the acoustic survey in May and the recently initiated egg survey. It has not been possible to provide a reliable analytic assessment for this stock as a basis for management. A better alternative would be to consider management rules based directly on survey observations.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that anchovy in Sub-area IXa can be classified under category 6.

Accordingly STECF notes that the rules for the above categories imply a TAC of 4,800 t in 2010 for Division IXa oly.

5.18. Anchovy (*Engraulis encrasicolus*) in Sub-area X

There is no information on Anchovy in Sub-area X.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that anchovy in VIII (Bay of Biscay) can be classified under Category 5

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2009/10 TAC	Basis
Category 5	NE*	Short-lived species: No in-year advice
* NE = not estimable		

5.19. Horse mackerel (*Trachurus trachurus*) in ICES division IXa

FISHERY: Catches decreased from the early 1960s but have been relatively stable since the early 1990s at 20,000t – 25,000 t. The fleets fishing for horse mackerel are also fishing for other species (e.g. sardine) and changes in the availability of those other species could affect the targeting on horse mackerel.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No reference points have been proposed for this stock.

STOCK STATUS: In the absence of defined reference points, the state of this stock cannot be evaluated with regard to these. Catches decreased from the early 1960s but have been relatively stable since the early 1990s. Based on the age composition of catches, the assessment conducted in 2008 and the exploratory assessment conducted in 2009, the recent level of catches do not seem to have been detrimental for the stock

RECENT MANAGEMENT ADVICE: ICES advises that catches in 2010 should not exceed 25 000 t. There are no explicit management objectives for this stock.

Other considerations:

The migratory pattern of southern horse mackerel shows that age classes are not evenly distributed over the area inhabited by the stock. Most of the older fish are present in the waters off Galicia and northern Portugal. An increased fishing effort in those areas could lead to a decline in the spawning stock.

STECF COMMENTS: STECF agrees with the advice from ICES. STECF notes that other species of horse mackerel are caught together with *T. trachurus* in Division IXa, in particular *Trachurus picturatus* of which 300–800 t have been caught annually since 2000. The advice for southern horse mackerel applies to the southern stock of *Trachurus trachurus* only.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission COM(2009) 224 on a consultation on fishing opportunities for 2010, STECF notes that Horse Mackerel (*Trachurus trachurus*) in Division IXa can be classified under Category 6.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

Category 6 State of the stock is not known; advice on appropriate catch

	2010 TAC	Basis
Category 6	57, 750 t	State of the stock is unknown, Annex III, Rule 4 (abundance information is not available), therefore an unchanged TAC.

5.20. Horse mackerel (*Trachurus trachurus*) in CECAF areas (Madeira Island)

The ICES Working Group on Mackerel, Horse Mackerel, Sardine and Anchovy reported that catches of this species have been around 1500 tonnes from 1986 to 1990. Since then catches have declined to less than 700 t. STECF did not have access to any other stock assessment information on horse mackerel in this area. A precautionary TAC in area X for 2009 was set to 1,280 t and is taken all from Portugal.

5.21. Horse mackerel (*Trachurus trachurus*) in CECAF areas (Canary Islands)

STECF did not have access to any stock assessment information on horse mackerel in this area. A precautionary TAC in area X for 2009 was set at 1,280 t. It is taken exclusively by Spain.

5.22. Horse mackerel (*Trachurus trachurus*) in ICES Subarea X (Azores Islands)

The 2002 ICES Working Group on Mackerel, Horse Mackerel, Sardine and Anchovy reported that the catches of *Trachurus picturatus* have been around 3000 t between 1986 and 1990. Since 1999 catches have remained around 1500t. STECF did not have access to any new stock assessment information on horse mackerel in this area.

A precautionary TAC in area X for 2009 was set to 3,200 t and is taken all from Portugal.

5.23. Sardine (*Sardina pilchardus*) in VIIIc and IXa

FISHERIES: Sardine in these Divisions are exploited by purse seiners from Portugal and Spain. Historically during the last 55 years landings have fluctuated with periods of high landings during the '40s, '60s and '80s, and low landings during the '50s, '70s and '90s. The total catch in 2008 was 101,000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment is based on combined Spanish and Portuguese March acoustic surveys, a DEPM (Daily Egg Production Method) survey series, and catch-at-age data. These have been analysed in a flexible age-structured model, combining these fishery-independent indices of abundance and catch-at-age information. The main uncertainties in the

assessment relate to the extent of sardine movement across the northern stock boundary, the weighting of Portuguese and Spanish acoustic surveys in the combined abundance index, and the estimation of selection for the older ages.

PRECAUTIONARY REFERENCE POINTS: No precautionary approach reference points have been identified for sardine stock.

STOCK STATUS: In the absence of defined reference points, the state of this stock cannot be evaluated with regard to these. SSB has declined since 2006 due to successive low recruitments and SSB in 2009 was below the long-term average. Fishing mortality in 2008 was 40% higher than in 2007, but is still below the historical average.

RECENT MANAGEMENT ADVICE: The current fishing mortality does not appear detrimental for the development of the stock, which is largely driven by the incoming recruitment. Therefore, ICES advises on the basis of exploitation boundaries in relation to precautionary considerations that the current level of fishing mortality could be maintained as a guide for management. This corresponds to a catch of 75 thousand tonnes in 2010.

STECF COMMENTS: STECF agrees with ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Sardine in VIIIc and IXa can be classified under Category 6.

Accordingly STECF notes that the rules for the above categories imply the following option for TAC in 2010.

	2010 TAC	Basis
Category 6	NE*	No TAC set for this stock.

* NE- not estimable

6. Widely distributed and migratory stocks

6.1. European eel (*Anguilla anguilla*)

The text below remains unchanged from that given in the STECF Consolidated review of advice for 2009 (STECF, 2009, EUR 23630 EN). STECF did not have access to more recent advice. In view of this, STECF has not attempted to categorise european eel according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

FISHERIES: The European eel (*Anguilla anguilla* (L.)) is found and exploited in fresh, brackish and coastal waters in almost all of Europe, in northern Africa and in Mediterranean Asia. Eel fisheries are found throughout the distribution area. Fisheries are generally organised on a small scale (a few fishermen catching 1-5 tonnes per year) and involve a wide range of gears. The fisheries are managed on a national (or lower, regional or catchment) level. Landings peaked around 1965 at 40,000 tonnes, since when a gradual decline occurred to a level of 20,000 tonnes in the late 1990s, but throughout the decades, landing statistics cover only about half the true catches. Recent years show a rapid decline in reported catches, to below 10,000 tonnes. Recruitment remained high until 1980, but declined afterwards, to a level of only 2 % of former levels in 2001, and has remained low since. Aquaculture of wild-caught recruits (glass eel) has been expanding since 1980, in Europe as well as in eastern Asia (using European glass eel). Other anthropogenic factors (habitat loss, contamination and transfer of diseases) have had negative effects on the stock, most likely of a magnitude comparable to exploitation. In 2007, eel was included in CITES Appendix II that deals with species not necessarily threatened with extinction, but in which trade must be controlled in order to avoid utilization incompatible with their survival. The listing will be made effective in March 2009.

SOURCE OF MANAGEMENT ADVICE: Management advice has been provided by ICES and FAO/EIFAC. The joint ICES/EIFAC working group is the main assessment body.

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be fully evaluated. An analytical assessment of the state of the European eel stock is not available and reference points for the stock have not been defined. Nevertheless, all available information indicates that the stock is at a historical minimum in most of the distribution area and continues to decline. Fishing mortality is thought to be high both on juvenile (glass eel) and older eel (yellow and silver eel). Recent recruitment varies between areas from 1 to 10% of the recruitment observed in the 1970s and most recent observations do not indicate recovery. Estimated total yield has declined to about 25% of the mid-1960s.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been agreed for eel. Due to the large uncertainties in eel management and biology (one single stock, spawning only once in their lifetime), ICES has proposed an escapement target of 50% (ICES, 2003). There are strong indications that recruitment might be impaired by the low spawning stock, while in the 1970s, recruitment of glass eel was still at historically normal levels. Therefore, an interim recovery level target could be 100% of the pre-1980 average silver eel escapement which generated higher recruitment.

MANAGEMENT OBJECTIVES: A management framework for the recovery of the European eel stock was established in 2007 through an EU regulation (EU 1100/2007). The objective of this Regulation is the protection and sustainable use of the stock. To achieve the objective, member states will develop eel management plans for their river basin districts, designed to reduce anthropogenic mortalities. According to the EU regulation, eel management plans shall allow, with high probability, an escapement to sea of at least 40% of the biomass of silver eel, defined as the best estimate of the theoretical escapement if the stock had been completely free of anthropogenic influences. The EU regulation does not quantify high probability.

RECENT MANAGEMENT ADVICE:

Exploitation boundaries in relation to precautionary considerations: The recruitment of glass eels to Europe has shown a sharp and continued decline over more than 25 years to historically low levels. These low recruitment levels are an indication that the reproduction might be seriously impaired as a result of the stock being severely depleted. Since recruitment remains in decline and stock recovery is a long-term process for biological reasons, ICES recommends that all exploitation and other anthropogenic impacts on production and escapement of eels should be reduced to as close to zero as possible.

STECF COMMENTS: STECF agrees with the advice of ICES and EIFAC and notes the adoption of the EU regulation setting out a management framework for the recovery of the European eel stock. Member States need to develop and implement national plans as soon as practicable. Development of adequate tools for setting reference points, for stock assessment, and for post-evaluation will be required, to support the development of these national management plans.

6.2. Hake (*Merluccius merluccius*) in Division Vb (1), VI and VII, and XII, XIV (Northern hake)

The management area covers Skagerrak, Kattegat, IIa, IIIb,c,d, IV, VI, VII, VIII, XII and XIV with separate TAC's for these Divisions.

FISHERIES: Hake is caught in nearly all fisheries in Subareas VII and VIII and also in some fisheries of Subareas IV and VI. The main part of the fishery (close to 80% of the total landings) was conducted in Subarea VII (Non-*Nephrops* trawling in medium to deep water, long-line in medium to deep water and gill nets in Sub-area VII), and in Sub-area VIII (gill nets in shallow to medium water and trawling in medium to deep water).

Landings were 47 800 t in 2008. The major fleets exploiting Northern hake have shown, in the longer term, a decrease in nominal fishing effort. Discards of juvenile hake can be substantial in some areas and fleets.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an age-based assessment using commercial CPUE series and survey data. Discards were not included in the assessment. Some discard data were available but it was not possible to incorporate these in a consistent way.

MANAGEMENT AGREEMENT: There are explicit management objectives for this stock in the recovery plan (EC Reg. No 811/2004). The aim is to increase the SSB to above 140 000 t. An agreed fishing mortality of

$F < 0.25$ with a year on year constraint on TAC of 15%, unless the stock is below 100 000. In this case a lower TAC will be applied.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points were updated in 2003 following a revision of the assessment model and data in the recent years. The basis for setting reference points remained unchanged. The proposed reference points are: B_{lim} : 100,000 t, B_{pa} : 140,000 t, F_{lim} : 0.35, F_{pa} : 0.25.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) and fishing mortality (in 2008) ICES classifies the stock as being at full reproductive capacity and being harvested sustainably. SSB is estimated to be just above B_{pa} in 2009, and F has been around F_{pa} since 2001. Recruitment has been relatively stable over the last decade.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of the exploitation boundaries in relation to precautionary limits that landings for 2010 should not exceed 55 200 t.

Other considerations:

Exploitation boundaries in relation to existing management plans: A fishing mortality of $F = 0.25$ as indicated in Article 5.2 of the agreed recovery plan is expected to lead to an SSB of 171,200 t in 2011 (the highest SSB since 1989), with estimating landings in 2010 of 55 200 t. This implies an increase in TAC of 7%.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: The fishing mortality in 2008, estimated at 0.24, is above fishing mortalities that are expected to lead to high long-term yields and low risk of stock depletion ($F_{0.1} = 0.10$ and $F_{max} = 0.18$). This indicates that long-term yield is expected to increase at fishing mortalities well below the historic values. Fishing at such a lower mortality is expected to lead to higher SSB and therefore lower the risk of observing the stock to be outside precautionary limits.

STECF COMMENTS: STECF agrees with the ICES assessment of the state of the stock and agrees with the TAC advice for 2010. STECF notes that ICES is based on the precautionary approach and not on the agreed management plan. However, the ICES approach results in a fishing mortality in 2010 which is consistent with the maximum fishing mortality allowed by the management plan.

STECF also agrees with ICES that effective measures to reduce discarding are also needed, given the substantial discards of juvenile hake in some areas and fleets.

STECF further notes ICES' concerns over several sources of uncertainty in the assessment and forecast for this stock, mainly due to growth and discards estimation. This raises questions on the accuracy of ageing data and the calculation of historic catch-at-age data. STECF notes that if growth of hake is underestimated, the stock is likely to be smaller and fishing mortality higher and reference points would need to be revisited. There are also large uncertainties associated with the most recent recruitment estimates; these are only estimated by a single survey. In the absence of reliable 2007 and 2008 recruitment estimates, geometric mean recruitment has been used in the forecast. STECF agrees with ICES concerns and considers that special attention must be paid to improve the accuracy of age determination and discards estimation.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN (Council Regulation (EC) No 811/2004).

STECF notes that this plan has not been evaluated to be consistent with the precautionary approach. However, as the result of the recommended TAC according the precautionary reference points and the agreed hake recovery plan are identical, STECF therefore advises that the TAC for 2010 should be set at 55 2000 t.

6.2.1. Special request on Hake VI & VII

STECF is requested to advise on the TAC corresponding to the application of the management plan proposed by the Commission in March 2009 (COM(2009) 122 final) which should replace the existing one this year.

STECF response

STECF notes that the provision of Articles 6 and 7 of (COM(2009) 122 final, set out the procedure for calculating TACs. Based on the most recent assessment of Northern hake, the stock is above B_{pa} . In such circumstances forecast total removals should be estimated based on a target fishing mortality rate of 0.17 (Article 6). Article 7 then makes provision for estimating the corresponding TAC by deduction from the

estimated total removals, a quantity of fish equivalent to the expected discards of hake from the stock concerned and as appropriate, a quantity corresponding to other relevant sources of hake.

STECF notes that the proportion of the total catch that is discarded is not available for recent years and that the assessment is based on landings data only. STECF is therefore unable to provide a value for a TAC corresponding precisely to the provisions of (COM(2009) 122 final. However, STECF notes that based on the 2009 ICES assessment for Northern hake, the predicted landings for Northern hake for 2010 corresponding to a target fishing mortality rate of $F=0.17$ are about 40,000 t.

6.3. Pollack (*Pollachius pollachius*) in all areas

There is no assessment or advice on Pollack in all areas.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Pollack in all areas can be classified under Category 11

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 11	15283 t*	There is no STECF advice, Average of recent catches, 15% TAC constraint

* Average 2006-2008 with 15% TAC constraint

6.4. Blue whiting (*Micromesistius poutassou* L.) in Sub -areas I-IX, XII and XIV

Blue whiting is widely distributed in the eastern North Atlantic extending from the Strait of Gibraltar to the Barents Sea. It consists of several populations with genetic “leakage” between them, but it is treated as one stock since it has so far not been possible to define an unambiguous border between populations.

FISHERIES: Blue whiting is exploited mainly by fleets from Norway, Russia, the Faroe Islands, and Iceland but the Netherlands, Scotland, Denmark, Ireland, Sweden, Germany and Spain also take substantial catches. The fishery for blue whiting was fully established in 1977. The Northern blue whiting stock is fished in Subareas II, V, VI, and VII and most of the catches are taken in the directed pelagic trawl fishery in the spawning and post-spawning areas (Divisions Vb, VIa,b and VIIb,c). Catches are also taken in the directed and mixed fishery in Subarea IV and Division IIIa, and in the pelagic trawl fishery in the Subareas I and II, in Divisions Va, and XIVa,b. The fisheries in the northern areas have taken 330,000 t to 640,000 t per year in the first half of the nineties, after which catches increased to close to 1,000,000 t in the latter part of the decade. Catches have been above 1,000,000 for most years after 2000 with 2003 and 2004 having recorded the highest catches (>2,200,000). In the southern areas (Subarea VIII, IX, Divisions VIId,e and g-k) catches have been stable in the range of 25,000 to 34,000 t between 1987 and 2006 with the exception of 2004 when 85,000 t were recorded. Catches in 2007 however, were at a historic low of 17,634 t. In Division IXa blue whiting is mainly taken as bycatch in mixed trawl fisheries.

Total landings over all areas in 2008 were 1.25 million t. Recent large landings were supported by high recruitments; however these have been steadily declining since 2001. The estimation of the last recruiting year-class 2007 is the lowest on record with 3.9 million new recruits. Most of the catches are taken in the spawning and post-spawning areas along the continental edge, and in the Norwegian Sea. In the latter, the share of the total catch has increased from 5% in the mid-nineties to about 40% in 2003 and 2004. A larger proportion of the catch there consists of young fish. In 2005, the fishery in the Norwegian Sea was reduced to about half of the 2004 fishery. In 2002 to 2005, and in the absence of agreements on TACs and their allocation, the EU, Faroe

Islands, Iceland, Norway, and the Russian Federation implemented unilateral measures to limit blue whiting catches.

A new management plan was agreed by Norway, EU, The Faroe Islands and Iceland, and NEAFC in November 2008, replacing the one agreed in 2005.

1. *The Parties agree to implement a long term management plan for the fisheries on the Blue Whiting stock, which is consistent with the precautionary approach, aiming at ensuring harvest within safe biological limits and designed to provide for fisheries consistent with maximum sustainable yield, in accordance with advice from ICES.*
2. *For the purpose of this long term management plan, in the following text, “TAC” means the sum of the coastal State TAC and the NEAFC allowable catches.*
3. *As a priority, the long term plan shall ensure with high probability that the size of the stock is maintained above 1.5 million tonnes (B_{lim}).*
4. *The Parties shall aim to exploit the stock with a fishing mortality of 0.18 on relevant age groups as defined by ICES.*
5. *While fishing mortality exceeds that specified in paragraph 4 and 6, the Parties agree to establish the TAC consistent with reductions in fishing mortality of 35% each year until the fishing mortality established in paragraph 4 and 6 has been reached. This paragraph shall apply only during 2009 and 2010.*

For the purposes of this calculation, the fishing percentage mortality reduction should be calculated with respect to the year before the year in which the TAC is to be established. For this year, it shall be assumed that the relevant TAC constrains catches.

6. *When the fishing mortality in paragraph 4 has been reached, the Parties agree to establish the TAC in each year in accordance with the following rules:*
 - *In the case that the spawning biomass is forecast to reach or exceed 2.25 million tonnes (SSB trigger level) on 1 January of the year for which the TAC is to be set, the TAC shall be fixed at the level consistent with the specified fishing mortality.*
 - *In the case that the spawning biomass is forecast to be less than 2.25 million tonnes on 1 January of the year for which the TAC is to be set (B), the TAC shall be fixed that is consistent with a fishing mortality given by:*
$$F = 0.05 + [(B - 1.5)(0.18 - 0.05) / (2.25 - 1.5)]$$
 - *In the case that spawning biomass is forecast to be less than 1.5 million tonnes on 1 January of the year for which the TAC is to be set, the TAC will be fixed that is consistent with a fishing mortality given by $F = 0.05$.*
7. *When the fishing mortality rate on the stock is consistent with that established in paragraph 4 and the spawning stock size on 1 January of the year for which the TAC is to be set is forecast to exceed 2.25 million tonnes, the Parties agree to discuss the appropriateness of adopting constraints on TAC changes within the plan.*
8. *The Parties, on the basis of ICES advice, shall review this long term management plan at intervals not exceeding five years and when the condition specified in paragraph 4 is reached*

ICES has evaluated the agreed management plan and concluded that the agreement is consistent with the precautionary approach (the risk of falling below B_{lim} in the long term 10-20 years is less than 5 %).

SOURCE OF MANAGEMENT ADVICE: The main body for management advice is ICES. The assessment uses catch-at-age data from commercial catches from 1981–2008 and three acoustic surveys (Norwegian

spawning ground survey 1993–2003, international ecosystem survey in the Nordic Seas 2000–2009, and the international blue whiting spawning ground survey 2003–2009). The international blue whiting spawning ground survey is the only survey that covers almost the entire distribution area of the spawning stock. The same assessment model has been used during the last four years. However, in this year's assessment, the results from the spawning ground survey were accorded greater statistical weight than in previous assessments because the survey time series is now longer than when the survey was initially included in the stock assessment (2007).

PRECAUTIONARY REFERENCE POINTS: The precautionary reference points for fishing mortality and biomass are $F_{pa}=0.32$, $F_{lim}=0.53$, $B_{pa}=2.25$ million t, $B_{lim}=1.5$ million t

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) and, fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and being harvested sustainably ($F=0.29$). Year classes 2005-2008 are among the lowest observed. Due to recent low recruitment, SSB has declined from its historical peak in 2003-2004 of more than 7 million tonnes to 3.6 million tonnes at the beginning of 2009, and the decline is expected to continue in the short-term.

Recent work on stock identification of blue whiting based on genetics and growth rates suggests that there is likely to be more than a single stock in the Northeast Atlantic. While more work is required to confirm the stock composition, blue whiting populations in areas VIIk and VIIj and further south likely form a separate unit from all other Northeast populations.

RECENT MANAGEMENT ADVICE: Following the agreed management plan implies landings of 540 000 tonnes in 2010 which is expected to lead to a decline in the SSB of 14% by 2011.

The agreed management plan is considered to be in accordance with the precautionary approach.

STECF COMMENTS: STECF agrees with ICES.

STECF encourages studies to determine the stock composition of blue whiting in the North-East Atlantic.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED NORWAY, EU, THE FAROE ISLANDS, ICELAND, AND NEAFC MANAGEMENT PLAN.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach.

Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 4	540,000 t	Follow relevant management plan.

6.4.1. Special Request to STECF on blue whiting

ICES advice on blue whiting contains the following explanation:

1. "The updated assessment has a lower fishing mortality in 2007 and a higher SSB in 2008 than estimated in last year's assessment. The estimated SSB for 2008 has been revised upwards by 40% and the estimated fishing mortality in 2007 has been revised downwards by 13%. Around 40% of the change in SSB is due to the greater reliance this year on spawning ground survey results (relaxation of the constraint on survey CV), and the remainder due to the addition of recent data."
2. STECF is asked to advise on the range of uncertainty in the stock assessment, in particular whether the revisions undertaken this year can be considered within the expected annual range of precision or exceptional.
3. STECF is also requested to analyse and explain the reduction in estimated recruitment of age 1 in the year 2008.

STECF response

Range of uncertainty

A comparison of the results of different annual assessments for blue whiting presented in ICES Advice 2009, Book 9, Figure 9.4.4.3, indicates that the revisions to F and SSB for 2007 and 2008 respectively arising from the revised 2009 assessment for blue whiting are within the range of precision previously observed in successive annual assessments of this stock (<http://www.ices.dk/committe/acom/comwork/report/2009/2009/whb-comb.pdf>).

Recruitment at age 1 in 2008

STECF notes that recruitment estimates are derived from 2 survey indices using the routine RCT3. The survey indices used are as follows:

- The international ecosystem survey standard area index
- The Barents Sea bottom-trawl time series.

Both recruitment series indicate that the 2005-2008 year-classes are extremely weak compared to earlier year-classes. The index value of 29 for year class 2007 (age 1 in 2008) from the international ecosystem survey standard area index is extremely low compared to the average value of 48 000 in the early part of the time series (1999-2004). The index of the Barents Sea bottom trawl survey is the third lowest in the time series (1981-2008). STECF also notes that both survey indices at age 1 have a zero value for the 2008 year class. The resulting RCT3 estimate of the 2007 year class (age 1 in 2008) is 3 869 billion fish, which is 72% lower than the GM of 13 890 billion fish for the whole time series.

6.4.2. Blue whiting (*Micromesistius poutassou* L.) in Sub -areas IIa(1)-North Sea (1)

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 6.4.

6.4.3. Blue whiting (*Micromesistius poutassou* L.) in Sub -areas Vb(1),VI,VII

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 6.4.

6.4.4. Blue whiting (*Micromesistius poutassou* L.) in Sub -areas VIIIabd

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 6.4.

6.4.5. Blue whiting (*Micromesistius poutassou* L.) in Sub -areas VIIIe

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 6.4.

6.4.6. Blue whiting (*Micromesistius poutassou* L.) in Sub -areas VIIIc,IX,X

Blue Whiting in these sub-areas is assessed together with all other areas as a single stock. See section 6.4.

6.5. Horse mackerel (*Trachurus trachurus*) in ICES Divisions IIa, IVa, Vb, VIa, VIIa-c,e-k and VIIIa-e (western stock)

FISHERY: Catches of 'Western' horse mackerel increased in the 1980s with the appearance of the extremely strong 1982-year-class. Changes in the migration pattern became evident at the end of the 1980s when the largest fish in the stock (mainly the 1982-year-class) migrated into Divisions IIa and IVa during the 3rd and 4th quarters. Following the changes in migration, a target fishery on horse mackerel developed in Division IVa by the Norwegian purse seiners. Most catches by other countries were taken in Sub-areas VI, VII and Divisions VIIIa-e.

The catches in Division IVa have dropped considerably since 1996 and Western horse mackerel has in recent years been taken in a variety of fisheries exploiting juvenile fish for the human consumption market (with midaged fish mostly for the Japanese market), and older fish either for human consumption purposes (mostly for the African market) or for industrial purposes. The juvenile fishery is mainly taken place in Divisions VIIe,h and VIIIa,d. Overall catch levels declined from 155,000 t in 2006 to 123,000 t in 2007. Estimated catches for 2008 were 140,000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The triennial horse mackerel egg survey provides an index of SSB, which together with the catches form the basis for the proposed management plan. The information available for western horse mackerel is sparse, and concerns about the quality of underlying data remain. However, ICES considers that the current assessment forms a sufficient basis for evaluating the state of the stock.

PRECAUTIONARY REFERENCE POINTS: In 2008 ICES has introduced a B_{lim} at 1.4 million t based on the stock that produced the 1982 year-class. No reference values for F are available.

STOCK STATUS: Based on the most recent estimate of SSB (in 2009), ICES classifies the stock as having full reproductive capacity. In the absence of defined F reference points, the state of this stock cannot be evaluated with regard to fishing mortality. The outstanding 2001 year class contributed to marked increases in SSB in 2004 and 2005, and SSB has remained above 2.5 million tonnes since 2005. Fishing mortality in recent years is relatively low.

MANAGEMENT PLAN: Following an EC request in 2007 to evaluate the consequences of the management plan proposed by the Pelagic RAC in July 2007, ICES has concluded that this plan for the period 2008 to 2010 is consistent with the precautionary approach, but that the plan is not precautionary in the longer term. The plan has provided a basis for the ICES advice on TACs for 2008–2010. The proposed management plan has yet to be formally adopted.

RECENT MANAGEMENT ADVICE: ICES advises on the basis of exploitation boundaries in relation to management plans that the TAC of 180 000 tonnes provided in the proposed management plan by the Pelagic RAC should be implemented in 2010.

Other considerations

Exploitation boundaries in relation to existing management plans: The proposed management plan provides for a TAC of 180 000 tonnes for the period 2008–2010 which is expected to maintain SSB above B_{lim} with a high probability. This TAC should apply to all areas where Western horse mackerel is caught (see table below).

Exploitation boundaries in relation to the precautionary approach: The proposed management plan is consistent with the precautionary approach in the short term.

Short term implications

Given that the proposed management plan was for a period of 3 years starting in 2008 and that the TAC level was considered precautionary by ICES, no short-term forecast was conducted. The assessment suggests that the expected fishing mortality associated with a catch of 180 000 t in 2010 is likely to be low and that the SSB will remain above B_{pa} .

Management considerations

The management plan proposed by the Pelagic RAC in 2007 makes use of the information available in the egg production surveys, and bases triennial TACs on the slope of the three previous egg production estimates. The proposed plan assumes that all catches are counted against the TAC.

The advice for horse mackerel assumes that all catches are counted against the TAC for each stock separately. In 2009 and before, the TAC covered only part of the distribution and fishing areas (EU waters). ICES advises that the management areas correspond to the distribution areas which include all EU and Norwegian and Faroese waters where horse mackerel are caught.

The table below summarizes TACs set, ICES advice, catch for 2008, and 2009 advice and TACs.

Areas	other	IXa	VIIIc	VIII abde	VII a-c,e-k	VIIId	VI	Vb	IIa	IVa	IVbc	IIIa	TAC and Advice 2008	Catch 2008	TAC and Advice 2009
TAC	CECAF X, XII												5.76		5.76
		SOUTHERN											57.8	42.9 ¹	57.8
				WESTERN AREA									170.0	139.1 ¹	170.0
									(EU)	(EU) NORTHERN		no TAC	39.3	15.9 ¹	39.3
												Total	272.9	197.9 ¹	272.9
Advice	no Adv.	SOUTH											25.0	23.6	25.0
				WESTERN STOCK						Q34		Q34	180.0	139.6 ²	180.0
											Q12 NORTH SEA		18.0	34.7 ²	18.0
												Total	223.0	197.9 ²	223.0
Landgs 2008		23.6	19.3	14.5	67.3	31.4	25.9	0.6	12	1	2.3	0		197.9	

All figures in thousand tonnes.

(1) landings from TAC regulated areas only, (2) includes discards
TACs for the Northern Area apply only to EU waters (in IVa and IIa)

Catches taken in IVa are attributed to North Sea Horse Mackerel in Quarters 1 and 2 and to Western Horse Mackerel in Quarters 3 and 4.

Catches taken in IIIa are attributed to Western Horse Mackerel in the western Skagerrak in Quarters 3 and 4 and to North Sea Horse Mackerel in all other areas and quarters.

From this table it can be seen that catches of the Southern horse mackerel and Western horse mackerel in 2008 are lower than the TACs and the ICES advice. In contrast, the catches of North Sea horse mackerel were 34.7 thousand tonnes following advice of 18 thousand tonnes in 2008. Most of the catch of North Sea horse mackerel is taken in ICES Division VIIId. The key problem is that the TAC for the Western stock is allocated to this ICES division, but catches from this area are of North Sea horse mackerel. To ensure precautionary management of all the horse mackerel stocks, area TACs should be allocated according to the advice section of the table above. Specifically, three measures need to be taken:

1. The TAC for western horse mackerel should apply to all areas where western horse mackerel is caught (EU, Norwegian, and Faroese waters) and where necessary be subject to agreement.
2. Catches from ICES Division VIIId should be taken against a TAC for the North Sea stock.
3. Catches taken in Division VIIIc need to be taken against a TAC for the western stock.

If the management area limits are revised, measures should be taken to ensure that misreporting of juvenile catch taken in Divisions VIIe,h and VIIId (the latter then belonging to the North Sea stock management area) is minimized.

STECF COMMENTS: STECF agrees with the ICES advice.

STECF notes that management plan for Western horse mackerel proposed by the Pelagic RAC has been evaluated by ICES. STECF agrees with ICES that this plan is precautionary for the period 2008 to 2010, but not in the long-term. STECF notes that the management plan has been developed for all fisheries that catch western horse mackerel, and recommends that if a TAC is set under this rule, all catches of Western horse mackerel should be counted against this TAC.

STECF notes, that the objective of the management plan is to maintain the SSB above the level observed in 1982 and that ICES in 2008 proposed to use this value as Blim for this stock based on the following rationale:
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“It could be assumed that the likelihood of a strong year-class appearing would decline if stock size were to fall below the stock size at which the only such event has been observed. The WG therefore considers the biomass that produced the extraordinary 1982 year-class as a good proxy for Blim.”

STECF considers that the justification for choosing SSB 1982 as Blim is very weak. There is no clear relationship between SSB and recruitment for this stock and although the spawning stock in 1982 produced a very strong year-class it does not mean that the SSB in 1982 is a good proxy for Blim. However, ICES’ recommendation that the management plan is consistent with the precautionary approach for the period 2008 to 2010 will still be valid even if Blim was increased by 30%. STECF, therefore, concur with ICES evaluation of the management plan.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE PROPOSED MANAGEMENT PLAN.

STECF notes that ICES has evaluated the management plan and has found it to be consistent with the precautionary approach in the short term.

Accordingly STECF notes that the TACs for 2010 corresponding to the management plan is as follows:

	2010 TAC	Basis
Category 4	180,000 t	Follow relevant management plan.

6.6. Mackerel (*Scomber scombrus*) - combined Southern, Western and North Sea spawning components)

ICES currently uses the term North East Atlantic Mackerel to define the mackerel present in the area extending from ICES Division IXa in the south to Division IIa in the north, including mackerel in the North Sea and Division IIIa. The spawning areas of mackerel are widely spread, and only the stock in the North Sea is sufficiently distinct to be clearly identified as a separate spawning component. Tagging experiments have demonstrated that after spawning, fish from Southern and Western areas migrate to feed in the Norwegian Sea and the North Sea during the second half of the year. In the North Sea they mix with the North Sea component. Since it is currently impossible to allocate catches to the stocks previously considered by ICES, they are at present, for practical reasons, considered as one stock: the North East Atlantic Mackerel Stock. Catches cannot be allocated specifically to spawning area components on biological grounds, but by convention the catches from the Southern and Western components are separated according to the area in which they are taken.

In order to be able to keep track of the development of the spawning biomasses in the different spawning areas, the North East Atlantic mackerel stock is divided into three area components: the Western Spawning Component, the North Sea Spawning Component, and the Southern Spawning Component. The Western Component is defined as mackerel spawning in the western area (ICES Divisions and Subareas VI, VII, and Divisions VIII a,b,d,e). This component currently comprises 81% of the entire North East Atlantic stock. Similarly, the Southern Component is defined as mackerel spawning in the southern area (ICES Divisions VIIIc and IXa).

Although the North Sea component has been at an extremely low level since the early 1970s, ACOM regards the North Sea Component as still existing. This component spawns in the North Sea and Skagerrak (ICES Subarea IV and Division IIIa). Current knowledge of the state of the spawning components is summarized below.

Western Component: The catches of this component were low in the 1960s, but increased to more than 800 000 t in 1993. The main catches are taken in directed fisheries by purse-seiners and mid-water trawlers. Large catches of the western component are taken in the northern North Sea and in the Norwegian Sea. The 1996 catch was reduced by about 200 000 t compared with 1995, because of a reduction in the TAC. The catches since 1998 have been stable. The SSB of the Western Component declined in the 1970s from above 3.0 million t to 2.2 million t in 1994, but was estimated to have increased to 2.7 million t in 1999. A separate assessment for this stock component is no longer required, as a recent extension of the time-series of NEA mackerel data now allows the estimation of the mean recruitment from 1972 onwards. Estimates of the spawning-stock biomass, derived from egg surveys, indicate a decrease of 14% between 1998 and 2001 and a 6% decrease from 2001 to the 2004 survey. The results from 2007 indicate a 5 % increase from 2004 to 2007.

North Sea Component: Very large catches were taken in the 1960s in the purse-seine fishery, reaching a maximum of about 1 million t in 1967. The component subsequently collapsed and catches declined to less than 100 000 t in the late 1970s. Catches during the last five years have been assumed to be about 10 000 t. The 2002 and 2005 triennial egg surveys in the North Sea both indicate similar egg production, but in 2008 it has decreased by about 40%.

Southern Component: Mackerel is a target species for the hand line fleet during the spawning season in Division VIIIc, during which about one-third of the total catches are taken. It is taken as a bycatch in other fleets. The highest catches (87%) from the Southern Component are taken in the first half of the year, mainly from Division VIIIc, and consist of adult fish. In the second half of the year catches consist of juveniles and are mainly taken in Division IXa. Catches from the Southern Component increased from about 20 000 t in the early 1990s to 44 000 t in 1998, and were close to 50 000 t in 2002. Estimates of the spawning-stock biomass, derived

from egg surveys, are highly variable, and give average estimates of around 16% of the combined NEA mackerel stock (1995–2007).

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICES. This assessment is based on catch numbers-at-age for the period 1972 to 2008 and triennial egg survey estimates of SSB from 1992 to 2007. Estimating proportions of catch discarded and slipped is problematic in pelagic fisheries due to high variability in discard and slipping practices. Recently information on these practices has been improving; current estimates from sampled fleets indicate that discarding is a small percentage of the total. Recruit surveys provide information on the distribution of young mackerel, but are subject to high variability and have not proved useful in estimating year-class strength.

PRECAUTIONARY REFERENCE POINTS:

The proposed precautionary reference points for fishing mortality and biomass are $F_{pa}=0.23$, $F_{lim}=0.42$, $B_{pa}=2.3$ million t, $B_{lim}=1.67$ million t

STOCK STATUS:

Based on the most recent estimate of SSB (in 2009), ICES classifies this stock as having full reproductive capacity. Based on the most recent estimates of fishing mortality (in 2008), ICES classifies the stock as being harvested at increased risk.

Fishing mortality in 2008 is estimated to be just above F_{pa} . SSB has increased by 47% since 2002 and is currently estimated to be above B_{pa} . The 2002 year class is the highest on record. Subsequent year classes are estimated to be about average. There is insufficient information to confirm the sizes of the 2007 and 2008 year-classes.

MANAGEMENT AGREEMENTS:

A new management plan was agreed by Norway, Faroe Islands and the EU in October 2008. ICES evaluated the plan and concluded that the plan is precautionary under the assumption that the TAC equals the total removals from the stock.

1. *For the purpose of this long-term management plan, “SSB” means the estimate according to ICES of the spawning stock biomass at spawning time in the year in which the TAC applies, taking account of the expected catch.*
2. *When the SSB is above 2,200,000 tonnes, the TAC shall be fixed according to the expected landings, as advised by ICES, on fishing the stock consistent with a fishing mortality rate in the range of 0.20 to 0.22 for appropriate age groups as defined by ICES.*
3. *When the SSB is lower than 2,200,000 tonnes, the TAC shall be fixed according to the expected landings as advised by ICES, on fishing the stock at a fishing mortality rate determined by the following:*

$$\text{Fishing mortality } F = 0.22 * \text{SSB} / 2,200,000$$

4. *Notwithstanding paragraph 2, the TAC shall not be changed by more than 20% from one year to the next, including from 2009 to 2010.*
5. *In the event that the ICES estimate of SSB is less than 1,670,000 tonnes, the Parties shall decide on a TAC which is less than that arising from the application of paragraphs 2 to 4.*
6. *The Parties may decide on a TAC that is lower than that determined by paragraphs 2 to 4.*
7. *The Parties shall, as appropriate, review and revise these management measures and strategies on the basis of any new advice provided by ICES*

RECENT MANAGEMENT ADVICE: ICES advises that any agreed TAC should cover all areas where Northeast Atlantic mackerel are fished. The agreed management plan (F between 0.2 and 0.22) would imply

catches between 527 000 t and 572 000 t in 2010. The SSB is expected to remain stable in 2011 for a catch in this range

ICES further advises that the existing measures to protect the North Sea spawning component remain in place. These are:

- There should be no fishing for mackerel in Divisions IIIa and IVb,c at any time of the year;
- There should be no fishing for mackerel in Division IVa during the period 15 February 31 July;
- The 30-cm minimum landing size at present in force in Subarea IV should be maintained.

In June 2009, an agreement was concluded between contracting parties to the Coastal States on mackerel banning highgrading, discarding, and slipping from pelagic fisheries targeting mackerel, horse mackerel, and herring beginning in January 2010.

STECF COMMENTS: STECF agrees with ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED NORWAY, EU AND FAROES MANAGEMENT PLAN.

STECF notes that ICES has evaluated the management plan and has found it to be consistent with the precautionary approach. However STECF notes inconsistencies between the SSB limits used - B_{Trigger} is set at 2.2 million tonnes, while B_{pa} is 2.3 million tonnes.

Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 4	Between 527 000 t and 572 000 t	Follow relevant management plan.

7. Elasmobranch resources in the Northeast Atlantic

The text in Section 7 remains unchanged from that given in the STECF Consolidated review of advice for 2009 (STECF, 2009, EUR 23630 EN). Advice on elasmobranch resources is provided every two years and the advice for 2010 was provided in 2008. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

7.1. General Comments

In European waters approximately 145 chondrichthyan species are listed, though this includes many species that are found either in the Mediterranean, or that have northerly records in the NE Atlantic off either Northwest Africa or Madeira (i.e. south of ICES Division IX). Many of these species are deep-water species for which the biology is poorly known.

FISHERIES: Historically, the increase of commercial fisheries directed to elasmobranch species and the economic value of them rank low among marine commercial fisheries (Bonfil, 1994). In the Northeast Atlantic, although some elasmobranchs are taken in directed fisheries (a few inshore vessels target skates and rays), the majority is landed as a by-catch from fisheries (various trawl, seine, longline and set net fisheries) targeting commercial teleost species. Recreational fisheries, including charter angling, for elasmobranchs may be an important component of the tourist industry in some areas.

Fisheries data for elasmobranchs in the ICES area are very poor in most of the cases, because the use of many countries "NEI" (not elsewhere identified) category. Furthermore, landings data is considered inaccurate for a number of reasons:

- a) Quota species may be reported as elasmobranchs to avoid exceeding quota. This would lead to over reporting.
- b) Fishermen may not take care when completing landings data records, for a variety of reasons.
- c) Administrations may not consider that it is important to collect accurate data for these species.

d) Some species could be underreported to avoid highlighting that by-catch is a significant problem in some fisheries.

In most countries skates and rays are landed together, most often sorted in particular size categories, rather than by species. They are usually gutted, and sometimes only wings are landed. For assessment purposes, species-specific catch data are essential. Only some countries report (part of) the landings by species, e.g. Sweden, France and lately Spain (Basque country). As a result of market sampling programmes the species composition of the landings can now be estimated for some of the countries landing skates and rays. In the North Sea (IIa & IV), for 2008 onwards, countries are obliged to report landings for the major skate species separately. On the basis of a longer track record on a species basis (at least 5 years) it will be possible in future to advise on species-specific catches (ICES advice 2008 book 9).

Until 1999, the only control on elasmobranch species in the North-east Atlantic were TACs for basking shark and porbeagle agreed between Norway and the EU for Norwegian vessels fishing in EU waters (REF SGRST 2006 OLD). Since then, in 1999, TAC introduced for “skates and rays” in the North Sea, for spurdog in area IV and division IIa and in 2007 for spurdog in IIIA, I, V, VI, VII, VIII, XII and XIV (ICES WGEF Report 2007) (subsequently altered to cover I, V, VI, VII, VIII, XII & XIV in 2008). In the NAFO area, some directed fisheries for spurdog and skate are regulated by quota controls

SOURCE OF MANAGEMENT ADVICE: The main advisory body is ICES and ICCAT (for pelagic sharks).

PRECAUTIONARY REFERENCE POINTS: The reference points of deepwater sharks are U_{lim} at $0.2 \times$ virgin biomass and U_{pa} at $0.5 \times$ virgin biomass. There are no reference points for spurdog, catsharks and nursehounds, basking sharks, porbeagles, tope, and ray and skates in the North Sea.

STOCK STATUS: Elasmobranchs are typically slow-growing, have a high age-at-maturity and a low reproductive capacity. As a result of their life history traits, they are particularly sensitive to exploitation. They can be depleted very quickly and recovery will be slow. Most, though not all elasmobranchs in the ICES area, have exhibited declines under pressure of fishing activity.

RECENT MANAGEMENT ADVICE: Survey data are the basis for the advice of skates, rays and demersal sharks in the North Sea and in the Celtic Seas. These data are the most reliable species-specific data available for demersal skates. However, many of the fishery-independent surveys in this ecoregion are not based on extensive time-series. These surveys are designed primarily for other types of fish and so the gears and sampling grids are not ideal for skate stocks, especially those species with patchy distributions (ICES advice 2008 book 5). In addition, the analysis of survey data is hampered by uncertainties about the proper identification of some species of skate, and starry ray may have been misidentified as thornback ray on some occasions. This leads to problems in the interpretation of some survey data (ICES advice 2008 book 9).

In 1997 ICES gave an overview of the relative status of the main skate species in the North Sea. In 2005 ICES produced advice for these species for the first time. ICES previously recommended that the catches for skates and rays be set to zero if, and only if skates and rays were landed as a generic group. Since it is now required to report by species, ICES is now providing advice for the main species. The basis for the advice is the same as in 2006. ICES in 2008 provided advice for the Celtic Seas and Bay of Biscay/Iberian demersal elasmobranchs for first time.

Due to their life history traits it is recommended that directed fisheries to exploit elasmobranchs should only be allowed when indicators and reference points for stock status and future harvest have been identified and management strategies, including appropriate monitoring requirements have been decided upon and are implemented.

There are potential problems in introducing effective management measures that will target elasmobranch species, which tend to be taken as a by-catch in multi-species fisheries, when management of the exploitation of other species inhabiting the same grounds may be a priority. Nevertheless, the possible benefits of implementing management measures (e.g. minimum and maximum landing sizes, and measures designed to protect nursery and breeding grounds) need to be fully investigated.

A Maximum Landing Length (MLL) of 100 cm for all skates and rays would be beneficial for common skate while not influencing most other species (ICES advice 2008 book 9). Because the elasmobranch species are caught as a by-catch in demersal fisheries, they would benefit from a reduction in the overall demersal fishing effort. Mesh-size regulations are probably not restrictive as there are few directed fisheries for these species (ICES advice 2008 book 5).

From 2005 to 2008 the TAC for North Sea skates and rays has been reduced by approximately 50%, and is now significantly lower than average recent landings. TACs only regulate the landings, and a low TAC on a low-value by-catch species could induce more discards. Discard survival is unknown although for some species is believed to be high, especially for the adult specimens.

Management objectives have not been adopted. An European sharks action plan was published by the European Commission in December 2007 and went out for consultation in 2008.

7.2. Spurdog (*Squalus acanthias*) in the North-east Atlantic

FISHERIES: Spurdog is a relatively small (<130 cm TL), widely distributed species occurring throughout the ICES area, and also widespread in the NW Atlantic, Pacific and other major oceans. Spurdog is one of the most important commercial elasmobranchs, with catches in directed and by-catch fisheries. There have been directed longline and gillnet fisheries in IIa, Iva, VIa, VIIa and VIIb-k and there are by-catches from demersal otter trawl and seine fisheries throughout the range of the stock.

The main fishing grounds for spurdog are: Norwegian Sea (ICES Sub-area II); North Sea (ICES Sub-area IV); NW Scotland (ICES Sub-area VI) and the Celtic Sea (ICES Sub-area VII). Some landings are also from the Skagerrak and Kattegat (ICES Sub-area IIIa) and Iceland (ICES Sub-area V). In the Celtic Sea, spurdog is caught primarily by French trawlers and by English and Welsh longliners. In the Bristol Channel and Irish Sea by fixed gill nets.

Scottish and Irish trawlers and seiners fish for spurdog off the west coast of Scotland, and some English longliners from the east coast moved into this area after continuous poor fishing in the North Sea. They are also taken in small quantities in the Bay of Biscay (ICES Sub-area VIII) and off Greenland. These last areas are considered to be outside the main area of the NE Atlantic stock, which is also considered to be separate (at least for assessment and management purposes) from the NW Atlantic stock. Although most spurdog are now taken as by-catch in otter trawls and seines aimed principally at whitefish, directed fisheries for this species continue to operate locally and seasonally.

In the UK (E&W), just over 50% of spurdog landings were taken in line and net fisheries in 2006, with most landings coming from Sub-area VII and in particular the Irish Sea. About 45% of the Scottish landings originating from demersal trawl fisheries and less than 30% of the Irish landings coming from the gill nets and line fisheries (ICES CM 2007/ACFM:27).

Landings of this species remain difficult to quantify due to differences in the level to which they are identified in national landing statistics. Landings which are specifically identified as *S. acanthias* probably represent a minimum estimate, while a maximum estimate includes categories such as “Squalidae”, “dogfish” or “dogfish and hounds” which may include a number of other species (eg. deep-water squalids, spotted dogs, smoothhound and tope). Though not complete, the landings data for spurdogs show a marked decline since the mid-1980s. In earlier times, up to 60,000t were landed annually in the early 1960s, landings averaged about 35,000t throughout the 1980s, then steadily declined to an average of about 15,000t by the late 1990s. The landings for 2005 were reported to be as low as 5600t and for 2006 3000t, the lowest for many decades.

A TAC has been introduced for the EU waters of Subarea IV and Division IIa in 1999. This TAC has been reduced from 8870t in 2001 to 1051t in 2006. A by-catch quota of 841t has been set in 2007 for IIa(EC) and IV. These species shall not comprise more than 5 % by live weight of the catch retained on board. A TAC has been set for first time in 2007 for IIIA , I, V, VI, VII, VIII, XII and XIV of 2828t, but this was subsequently altered to 2004 t covering only areas I, V, VI, VII, VIII, XII and XIV in 2008. In 2008 there was no TAC for Division IIIa. Norway has a 70-cm minimum landing size, but it is not known if this is effective in reducing the exploitation of mature females. (ICES advice 2006 widely distributed stocks).

In 2007 Norway introduced a general ban on fishing and landing of spurdog in the Norwegian economic zone and in international waters in ICES areas I-XIV. However, boats less than 28m in length are allowed to fish for spurdog with traditional gear inshore and in territorial waters (4 nm). Spurdog caught as by-catch in other fisheries have to be landed and Fiskeridirektoratet are allowed to stop the fishery when catches reach last years level. Norway has a 70 cm minimum landing size. In 2004, Germany proposed that the EU propose that spurdog be listed under Appendix II of CITES (i.e. so that nations involved in the import/export trade would have to

show that the harvesting and utilization was sustainable). Sweden has recently added spurdog to their national Red List.

SOURCE OF MANAGEMENT ADVICE: The main advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been defined or agreed for spurdog in the Northeast Atlantic.

STOCK STATUS: All analyses presented in previous reports of WGEF have indicated that the NE Atlantic stock of spurdog has been declining rapidly and is at its lowest ever level. Preliminary assessments making use of the long time-series of commercial landings data suggest that this decline has been going on over a long period of time and that the current stock size may only be a small fraction of its virgin biomass (< 10%). In addition, spurdog are less frequently caught in groundfish surveys than they were 20 years ago, and the preliminary analysis of Scottish survey data presented in 2006 (and in Dobby *et al.*, 2005) indicate significant declines in catch-rate (> 75% decline in CPUE since 1985). Input data are too limited to give an accurate estimate of current stock status in terms of absolute biomass and fishing mortality, but the illustrated trends in the stock biomass are undeniable (ICES CM 2007/ACFM:27).

RECENT MANAGEMENT ADVICE: The biology of spurdog is relatively well known in comparison to most other elasmobranch. Survey and landings data are available. A number of different methods have been explored making use of the long time-series of landings data, including surplus production models, separable age-based assessments and length-structure approaches. Survey data have also been analysed in terms of trends in CPUE and frequency of occurrence in survey hauls. All analyses indicate similar stock trends. Although these models have not proved entirely satisfactory (due to the quality of the assessment input data), these exploratory assessments and survey data, indicate a decline in spurdog (ICES CM 2007/ACFM:27).

The ICES 2008 advice for 2009 and 2010 is the same as the advice given in 2006 since the only new information available for the stock was landings data which does not offer any reason to change the advice. The stock is depleted and may be in danger of collapse. ICES therefore advises that targeted fisheries should not be permitted to continue, and by-catch in mixed fisheries should be reduced to the lowest possible level. The TAC should cover all areas where spurdog are caught in the northeast Atlantic and should be set at zero for 2009.

Additionally to the 2006 advice, ICES offers the following considerations:

Simulation modelling has shown there are strong potential benefits to the stock by protecting mature female spurdog in this long-lived species. If a non-zero TAC would be set, ICES recommends the introduction of a **maximum** landing length (MLL). This is expected to deter fisheries targeting areas where large females occur.

The maximum landing length should initially be set at 100 cm. The length at 50% maturity for female spurdog is just over 80 cm and the maximum size of females is about 120 cm. The maximum size of males is about 90 cm. Fecundity of spurdog increases with length and females of 100–120 cm length generally produce the highest amount of pups (10–21). Survivorship of spurdog released from longline fisheries is thought to be high, but will be lower in gillnet and trawl fisheries.

It is recommended that exploitation of this species should only be allowed when indicators and reference points for stock status and future harvest have been identified and a management strategy, including appropriate monitoring requirements has been decided upon and is implemented. (ICES advice 2006 widely distributed stocks).

In addition, because a large proportion of spurdog are taken as by-catch in mixed demersal trawl fisheries, ICES supports the opinion that the stock would be benefited from a reduction in overall demersal fishing effort. Spurdog form size- and sex-specific schools and these have historically been subject to directed fisheries specifically targeting large females.

STECF COMMENTS: STECF agrees with the ICES advice

7.3. Catsharks and nursehounds (*Scylliorhinus canicula* and *Scylliorhinus stellaris*) in the north-east Atlantic

FISHERIES: In the NE Atlantic nursehounds (*Scylliorhinus canicula* and *Scylliorhinus stellaris*) appear to be much more sedentary than the spurdog, and the few available tagging results indicate quite restricted movement.

The nursehound is found on rough, even rocky grounds to the south and west of the UK, extending to the Mediterranean. Because it is comparatively scarce it has only a minor contribution to commercial fisheries.

Lesser spotted dogfish *Scyliorhinus canicula* is common on all coasts, from Mediterranean latitudes to south Norway, and contributes substantially to the landings of 'dogfish' from the North Sea, English Channel, Celtic Sea and Iberian waters. This species is taken primarily as a by-catch in demersal fisheries targeting other species and a large proportion of the catch is discarded, although in some coastal areas there are seasonal small-scale directed fisheries. In areas III, IV and VIId, landings for *Scyliorhinus canicula* increased from 1633 in 2000 to 1842t in 2006. In the Bay of Biscay and Iberian waters landings of *Scyliorhinus* spp have recorded since the mid nineties and have fluctuated between 1500t and 2000t. Landings were 1688t in 2005 and 1572 in 2006.

SOURCE OF MANAGEMENT ADVICE: The main source of information on lesser-spotted dogfish in the Northeast Atlantic is ICES.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for *S. canicula* or *S. stellaris* in the Northeast Atlantic.

STOCK STATUS: The stock structure is unknown although it is admitted separate stocks reside in separate ICES Divisions and that immigration and emigration from adjacent populations are either insignificant or on a par. An assessment of *S. canicula* in the Cantabrian Sea indicates an increase in the stock. Possible explanations for this increase in abundance of lesser-spotted dogfish is the high survival of discards, plus the fact that other discarded fish might be providing additional food sources to the dogfish. The stock of the lesser spotted dogfish in North Sea shows a general increase in abundance, whereas in areas VIa and VII is stable/increased. The greater spotted dogfish in area VII is locally stable and is increasing in area VIIa. (ICES advice 2008). Both species have a high discard survival ratio.

RECENT MANAGEMENT ADVICE:

Appropriate species-specific landings (for *Scyliorhinus* spp.) are required before the level of a *status quo* catch could be advised on. There are no management measures in place for the demersal sharks (*Scyliorhinus*) in North Sea and Celtic Seas. The current exploitation rates on this species appear to be sustainable. As there are no apparent detrimental impacts on the stock from current commercial fisheries, no management actions are required for this species at this time. The greater spotted dogfish in Celtic seas has a restricted distribution and is locally abundant in parts of the Celtic Seas ecoregion, and should be monitored appropriately.

STECF COMMENTS: STECF agrees with the ICES advice.

7.4. Basking shark (*Cetorhinus maximus*) in the north-east Atlantic

FISHERIES: According to WGEF a single stock of basking sharks *Cetorhinus maximus* exists in the ICES area. There is no information on transatlantic migrations. A genetics study underway in the UK aims to differentiate distinct stocks globally. They are known to congregate in areas with a high zooplankton biomass (e.g. fronts) and, therefore, may be locally important, but the locations of these areas are variable.

Biological data are limited, although all lamniform sharks have a very low fecundity and late age at maturity and they are likely to be sensitive to additional mortality.

There have been directed fisheries for this species by Ireland, the UK, and Norway. The last directed fishery was that of Norway, and was prosecuted in II, IV, VI and VII. The Norwegian fleet has prosecuted local fisheries from the Barents Sea to the Kattegat, as well as more distant fisheries ranging across the North Sea and as far as the south and west of Ireland, Iceland and Faeroe. The geographical and temporal distribution of the Norwegian domestic basking shark fishery changes markedly from year to year, and this was suggested by Stott (1982) to be due to the unpredictable nature of the sharks' inshore migration. Recent studies have highlighted the important role that oceanographic conditions can play in affecting basking shark distribution.

Since the mid-1940s, catches have varied considerably. In the late 1970s catches were about 10000t, in early 1980s about 4000t and in recent years a serious decline has been registered with catches ranging between 77t and 293t in the last eight years. Catches in 2005 were 221t and in 2006 16t (Norwegian by-catch) which was considerably less than in 2005. It is not known whether this decrease is related to marked price reductions, or that release of live specimens has increased, or because actual abundance has declined.

Limited quantitative information exists on basking shark discarding in non-directed fisheries. However, anecdotal information is available indicating that this species is caught in gillnet and trawl fisheries in most parts of the ICES area. Most of this by-catch takes place in the summer months as the species moves inshore. The total extent of these catches is unknown. The requirement for EU fleets to discard all basking sharks caught as by-catch means that information cannot be obtained on these catches. A better protocol for recording and obtaining scientific data from by-catches is necessary for assessing the status of the stock.

Since 2006, there is no targeted fishery for basking sharks in Norway, UK or Ireland. Based on ICES advice Norway banned all directed fisheries for basking shark in 2006, but dead or dying by-catch specimens can be landed and sold as before. The basking shark has been protected from killing, taking, disturbance, possession and sale in UK territorial waters since 1998. In Sweden it is forbidden to fish for or to land basking shark. Since 2002, there has been a complete ban on the landings of basking shark from within the EU waters of ICES Sub-areas IV, VI and VII (Annex ID of Council Regulation (EC) 2555/2001). Since 2007, the EU has prohibited fishing for, retaining on board, transshipping or landing basking sharks by any vessel in EU waters or EU vessels fishing anywhere (Council regulation (EC) No 41/2006).

Basking shark was listed on Appendix II of the Convention on International Trade in Endangered Species (CITES) in 2002, on Appendices I and II of the Convention on the Conservation of Migratory Species (CMS) in 2005, on Annex I, Highly Migratory Species, of the UN Convention on the Law of the Sea (UNCLOS) and on the OSPAR (Convention on the protection of the marine environment of the north-east Atlantic) list of threatened and / or declining species in 2004.

SOURCE OF MANAGEMENT ADVICE: The main advisory body is ICES. There is no assessment of this stock. The evaluation is based on landings data and anecdotal information.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for basking shark in the Northeast Atlantic.

STOCK STATUS: Available landings and anecdotal information suggest that the stock is severely depleted.

RECENT MANAGEMENT ADVICE: The only new information available in 2008 for basking shark is landings data which gives no basis to revise the advice from 2006. The advice for 2009 and 2010 is therefore the same as the advice given in 2006: “No targeted fishing for basking shark should be permitted and additional measures should be taken to prevent by-catch of basking shark in fisheries targeting other species. A TAC should cover all areas where basking sharks are caught in the northeast Atlantic. This TAC should be set at zero.” At present there is no directed fishery for this species. The WGEF considered that no targeted fishery should be permitted unless a reliable estimate of a sustainable exploitation rate is available. The TAC area should correspond to the stock’s distribution, thus the entire ICES area. The present TAC only covers Areas IV, VI & VII, although most of the recorded landings are in Areas I & II. Proper quantification of the impact of by-catch, discarding, and ship strikes on this species in the ICES area is required. Where national legislation prohibits landing of by-caught basking sharks, measures should be put in place to ensure that incidental catches are recorded and carcasses made available for research. ICES advises that additional measures should be taken to prevent by-catch of basking shark in fisheries targeting other species.

STECF COMMENTS: STECF agrees with the ICES advice.

7.5. Tope (*Galeorhinus galeus*) in the north-east Atlantic

FISHERIES: There are currently no targeted commercial fisheries for tope in the north-eastern Atlantic, though they are taken as a by-catch in trawl, gillnet and longline fisheries, including demersal and pelagic set gears. Though tope are discarded in some fisheries, due to their low market value, other fisheries land this by-catch. Tope is also an important target species in recreational sea angling and charter boat fishing in several areas, with most anglers and angling clubs following catch and release protocols. Landings data are limited, as landings data are often included as “dogfishes and hounds” (DGH). Nevertheless, England and France have some species-specific landings data, and there are also limited data from Denmark, Ireland, Portugal and Spain in recent years. Many of the reported landings are from the English Channel, Celtic Sea and northern Bay of Biscay. Tope is also caught in Spanish fisheries in the western Cantabrian Sea (Galicia), where about 80% of the landings are from longline vessels, with the remainder from trawl and small gillnets. Tope also feature in the catches off mainland Portugal, and are an important component of Azorean bottom long line fisheries. Tope are

also caught in offshore long-line fisheries is this area. There were no major changes to the fishery noted in 2006. It has been suggested that there may be a greater retention of tope in some UK inshore fisheries operating in ICES Division IVc, as a result of by-catch limits on skates and rays, although no data are currently available to examine this.

Landings were increased since 1992 until 2002 (from 427t to 798t), then dropped to 372t in 2005. In 2006 landings were 497t. The degree of possible mis-reporting or under-reporting is not known. Landings indicate that France is one of the main nations landing tope. The United Kingdom also land tope, though species-specific data are not available prior to 1989. Since 2001, Ireland, Portugal and Spain have also declared species-specific landings, though recent data were not available for Spanish fisheries. Though some discards information is available from various nations, data are limited for most nations and fisheries. The available data (England and Wales) indicated that juvenile tope tend to be discarded in demersal trawl fisheries, though larger individuals are usually retained, with tope caught in drift and fixed net fisheries usually retained.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information is ICES. However no species specific management advice is given.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for tope in the Northeast Atlantic.

STOCK STATUS: Stock structure is unknown. No assessment was undertaken, due to insufficient data. WGEF considers that there is a single stock of tope in the ICES area, with the centre of the distribution ranging from Scotland and southern Norway southwards to the coast of north-western Africa and Mediterranean Sea. Hence, the North East Atlantic tope stock covers the ICES Area (II–X), Mediterranean Sea (Subareas I–III) and northern part of the CECAF area, and any future assessment of the Northeast Atlantic tope stock may need to be undertaken in conjunction with the General Fisheries Commission for the Mediterranean (GFCM) and Fishery Committee for the Eastern Central Atlantic (CECAF). The stock unit identified by WGEF was based on published tagging studies which clearly indicate that tagged fish move widely throughout the north-eastern Atlantic). Tope is listed in the UK Biodiversity priority list and is classified as Vulnerable in the IUCN Red data List.

RECENT MANAGEMENT ADVICE: There is no species specific management advice for Tope in the NE Atlantic. However ICES considers that tope is highly vulnerable to over-exploitation, as they have low population productivity, relatively low fecundity and protracted reproductive cycle. Unmanaged, targeted fisheries elsewhere in the world have resulted in stock collapse (e.g. off California and in South America).

STECF COMMENTS: STECF has no comments.

7.6. Rays and Skates in the North Sea and Celtic Seas

SPECIES:

Common skate	<i>Dipturus batis</i>	North Sea	Celtic Seas
Thornback ray	<i>Raja clavata</i>	North Sea	Celtic Seas
Spotted ray	<i>Raja montagui</i>	North Sea	Celtic Seas
Starry ray	<i>Amblyraja radiata</i>	North Sea	Celtic Seas
Cuckoo ray	<i>Leucoraja naevus</i>	North Sea	Celtic Seas
Blonde ray	<i>Raja brachyura</i>	North Sea	Celtic Seas
Undulate ray	<i>Raja undulata</i>	North Sea	Celtic Seas
Smalleyed ray	<i>Raja microocellata</i>		Celtic Seas
Sandy ray	<i>Leucoraja circularis</i>		Celtic Seas
Shagreen ray	<i>Leucoraja fullonica</i>		Celtic Seas
White skate	<i>Rostroraja alba</i>		Celtic Seas

DISTRIBUTION OF SKATES: Collectively, skates have a wide distribution in coastal waters of the Northeast Atlantic, though individual species can be localized in a relatively small area where their preferred habitat occurs. The most abundant skate species in the North Sea is starry ray (*Amblyraja radiata*).

Cuckoo ray (*Leucoraja naevus*), is a relatively small-bodied species ($L_{MAX} = 75\text{cm}$) that lives in shallow to moderate depths from 20 m down to about 150 m in the north-west sector of the North Sea. Thornback ray (*R. clavata*) has a more coastal distribution, being found in water depths down to 60 m. It occurs in a number of local concentrations in the North Sea, between which there appears to be a regular exchange of individuals (Walker *et al*, 1997).

All rays have a commercial value, except for starry ray (*A. radiata*), though even this species is landed incidentally in the Danish industrial fisheries and is taken in Icelandic fisheries.

Common skate (*Dipturus batis*) tends to be found in water from 30 to 600 m deep, whilst the long-nose skate (*D. oxyrinchus*) is found in deeper water from 150 to 900 m, although juveniles can be found in shallower water (Wheeler, 1969). The distribution of the latter species is not as extensive as that of the common skate, being found off southern Norway and around Scotland. In the past, the common skate was considered to be extensively distributed throughout the central and northern North Sea, but in the last few decades this species appears to have retreated to the very northern North Sea and is currently caught only off Shetland (Walker, 1995).

FISHERIES: Rays and skates are taken as target and by-catches in most demersal fisheries in the ICES area, with the exception of the Baltic. There are some directed fisheries, for example, in VIIa, but most ray and skate landings are by-catches in trawl and in seine fisheries.

A generic TAC introduced for all skate and rays species in North Sea in 1999 but not yet for Celtic Seas. Prior there has been no obligation for fishermen to record catches in the logbooks used for monitoring quota uptake of TAC species. As a consequence, there is a lack of information on the fisheries for rays. Statistical information by species is also limited because few European countries differentiate between species in landings statistics and they are collectively recorded as skates and rays. The main exception is France, for which the cuckoo ray and the thornback ray are the most important species of skates and rays landed.

After France, the UK lands a greater weight of mainly thornback, cuckoo, blonde and spotted rays than any other European country. The majority of rays landed by both these countries, and from the Netherlands, Belgium, Denmark, Germany and Sweden are taken as a by-catch in otter trawls and seines aimed principally at gadoids and flatfish. There are, however, a number of small-scale fisheries using large meshed tangle nets directed at thornback ray, and there have been directed longline fisheries for common skate.

Ray fisheries occur in coastal waters and tend to be seasonal, and size selection in towed gears is minimal owing to the shape of rays, though selection on board has occurred to comply with the market's preference for larger fish. Rays have been subjected to intensive exploitation in the North Sea: Landings decreased significantly during the 1930s, but increased after World War II, during which period fishing had almost ceased. In the southern North Sea, landings have declined since 1948, whereas in the northern and central area the major decline started around 1965. Walker (1994) reports that, despite an increase in fishing effort, landings dropped from 12 to 5 thousand tonnes between 1954 and 1974. Since the mid-1970s, total landings of rays from the North Sea have remained more or less constant and, in recent years, Norwegian landings from the northern North Sea and Norwegian Sea have seldom exceeded 1000 t.

Overall landing figures for Rays and Skates in the North Sea have decreased in the last 10 years from almost 5,000t in 1996 to 3,000t in 2005, and 2,800 in 2006. For 2007, the landings estimated to be 1,100 t (preliminary data). In Celtic Seas, landings from 19,000 in 2006 decreased to 10,000 in 2006.

SOURCE OF MANAGEMENT ADVICE: The main advisory body is ICES. In 2008, ICES gave advice for Celtic Seas rays and skates for first time.

PRECAUTIONARY REFERENCE POINTS: There are no agreed reference points for rays and skates in the North Sea.

STOCK STATUS: In the absence of defined reference points, the status of the stocks of demersal skates and rays (members of the family Rajidae) cannot be evaluated. The following provides a qualitative summary of the general status of the major species based on surveys and landings:

North Sea

- Common skate* – is depleted in IVa (likely merging with VIa & IIa). It was formerly widely distributed over much of the North Sea but is now found only rarely, and only in the northern North Sea. The distribution extends into the west of Scotland and the Norwegian Sea.
- Thornback ray* – Stable/increasing in areas IVc, VIId and uncertain in IVa,b. The distribution area and abundance have decreased over the past century, with the stock concentrated in the southwestern North Sea where it is the main commercial skate species. Its distribution extends into the eastern Channel. Survey catch trends in Division IVc have been stable/increasing in recent years. The status of *R. clavata* in Divisions IVa,b is uncertain.
- Spotted ray* – stable/increasing in IVb,c. The area occupied and abundance has fluctuated without trend.
- Starry ray* – stable in IVa,b, IIa. Survey catch rates increased from the early 1970s to the early 1990s and have decreased slightly since then.
- Cuckoo ray* – stable in IVa,b. Since 1990 the area occupied has fluctuated without trend. Abundance has decreased since the early 1990s, but has been stable in recent years.
- Blonde ray* – uncertain in IVc, VIId. This species has a patchy occurrence in the North Sea. It is at the edge of its distributional range in this area.
- Undulate ray* – uncertain, reason for concern in VIId, merges with VIIe. Mainly limited to Division VIId where it merges with Division VIIe. Occasional vagrants in Division IVc. The biology of the species and recent disappearance from surveys give rise to concern. It has a patchy and localized distribution, possibly forming discrete stocks, which make the undulate ray sensitive to local depletion. Additionally, the species has disappeared from the English beam trawl survey in Division VIId in the last two years.

Celtic Seas

- Common skate* – Depleted in areas VI, VII. It was formerly widely distributed in the Irish Sea (VIIa), but is now rarely found in this division. Now mostly found off Northwest Scotland (VIa), west of Ireland (VIIb,c), and in the deeper waters of the Celtic Sea (VIIg-j), with occasional individuals in shallower areas (VIIe-f).
- Thornback ray* – Stable/increasing in areas VIa, VIIa,f,g. Catches in the main areas of abundance (VIa, VIIa,f,g) have been stable/increasing in recent years
- Spotted ray* – Stable/increasing in areas VIa, VIIa,f,g.. Catches in the main areas of abundance (VIa, VIIa,f,g) have been stable/increasing in recent years
- Cuckoo ray* – Stable/increasing in area VIa, uncertain in area VII. Uncertain and more robust studies on stock identity are required. Data from surveys give contrasting signals showing stable/increasing catches in VIa, but stable or declining catches within Subarea VII. French lpue in the Celtic Sea is also declining.
- Blonde ray* – Uncertain in areas, VIa, VIIa, f. This species has a patchy distribution in the Celtic Seas ecoregion, so interpretation of survey trends is problematic.
- Undulate ray* – Uncertain in areas VIIj and VIId,e. Given that this large-bodied species has a patchy distribution in the inshore waters of the Celtic Seas ecoregion, it is susceptible to localized over-exploitation.
- Smalleyed ray* – Stable/increasing in area VIIf. Catches in the main area of the stock distribution (VIIf) have been stable/increasing over the survey time-series.
- Sandy ray* – Uncertain in area VI, stable/increasing in area VIIb,c,h-k. This offshore species is not well sampled in most groundfish surveys. Catches on the Porcupine Bank have been stable/increasing in recent.
- Shagreen ray* – Uncertain in area VII. This offshore species is not well sampled in most groundfish surveys.
- White skate* – Severely depleted in area VII. Possibly extirpated from most parts of this ecoregion. No authenticated records in recent groundfish surveys.

RECENT MANAGEMENT ADVICE: In 2006 the EC TAC for skates and rays for areas IIa (EC waters) and IV (EC waters) was set at 2737t, which was 15% less than the TAC for 2005. The TAC for 2007 was set at 2190t, 20% less than that for 2006 (on no particular scientific ground). This TAC is indicated to comprise of “by-catch quota” and it is specifically mentioned that “These species shall not comprise more than 25% by live weight of the catch retained on board”. Subject to the individual recording of landed species, combined catches for demersal skates and rays should be set on the basis of the recent average landings (2002–2006). The ICES advice for 2008 was zero catch while for 2009 and 2010 is the combined catches of recent average landings (2002–2006). According to this advice, the predicted landings for 2009 and 2010 are expected to be 3100t for IIIa, IV and VIId. Targeted fisheries of the most threatened species (common skate and undulate ray) should not be permitted, and measures should be taken to minimize by-catch.

From 2005 to 2008 the TAC for North Sea skates and rays has been reduced by approximately 50%, and is now significantly lower than average recent landings. Based on the level of recent landings it is obvious that the current TAC has become restrictive for some countries, which may increase discarding. Discard survivorship, however, is not known. A Maximum Landing Length (MLL) of 100 cm for all skates and rays would be beneficial for common skate while not influencing most other species.

Species specific advice in North Sea

Common skate and Undulate ray: ***No target fisheries*** (target fisheries for these species should not be permitted and measures should be taken to minimize by-catch).

Spotted ray, Starry ray, Cuckoo ray, Thornback ray (in Division IVc): ***Status quo catch*** (fishing mortality should not increase and the fishery should be closely monitored. Measures to deter fisheries that target spawning concentrations of thornback ray in Division IVc should be considered because this is the most vital part of the thornback ray spawning in the southwestern North Sea).

Blonde ray Thornback ray (in Division IVa,b): ***No advice*** (Because these species have a tendency to form aggregations, they may be prone to localized depletion).

Species specific advice in Celtic Seas

White skate: ***No fisheries*** (has a localized and patchy distribution, and is extirpated from most parts of the Celtic Seas ecoregion. It should receive the highest possible protection. Any incidental by-catch should not be landed, but returned, to the sea, as they are likely to have a high survival rate).

Common skate, Undulate ray: ***No target fisheries*** (Common skate has declined in many inshore areas of England and Wales, although is still present in the inshore areas of Scotland and Ireland. Target fisheries for this species should not be permitted and measures should be taken to minimize by-catch and undulate ray has a patchy distribution, with some of these areas showing signs of depletion. As a precautionary measure, target fisheries for this species should not be permitted unless exploitation rates are shown to be sustainable).

Thornback ray, spotted ray in VIa and VIIa,f,g., cuckoo ray in VIa and smalleyed ray in VIIf: ***Status quo catch*** (smalleyed ray has a restricted distribution and is locally abundant in the Bristol Channel, this stock should be monitored to ensure that it does not decline).

Cuckoo ray in VII, blonde ray, sandy ray, shagreen ray: ***No advice*** (For cuckoo ray, further studies to better understand stock structure are required, although this species is one of the more abundant skates in the Celtic Seas ecoregion, blonde ray is widely distributed in the Celtic Seas ecoregion, but it has a tendency to form local aggregations and so may be prone to localized depletions, sandy ray is most abundant on the outer continental shelf and upper continental slope, it is not well sampled in most existing groundfish surveys and shagreen ray is most abundant on the outer continental shelf and upper continental slope, it is not well sampled in most existing groundfish surveys).

STECF COMMENTS: STECF agrees with the ICES advice

7.7. *Porbeagle (Lamna nasus)* in the north-east Atlantic

FISHERIES: Porbeagle is a highly migratory and schooling species. Sporadic targeted fisheries develop on these schools. Porbeagle fisheries are highly profitable. The main countries catching or having caught porbeagles are Spain and France. However in the past, important fisheries were prosecuted by Norway, Denmark and the Faeroe Islands.

The only regular, target fishery that still exists is the French fishery. Several countries have sporadic fisheries taking porbeagles (which also takes occasional tope and blue sharks), in the North Sea, west of Ireland and Biscay, as they appear. These include Denmark, UK, and French vessels fishing to the south and west of England. There is a by-catch by demersal trawlers from many countries, including Ireland, UK, France and Spain.

SOURCE OF MANAGEMENT ADVICE: The main recent sources of information and advice on porbeagle in the Northeast Atlantic is ICES. There is no fishery-independent information on this stock. Landings data for porbeagle may be reported as porbeagle, or as ‘various sharks nei’ in the official statistics. This means that the reported landings of porbeagle are likely an underestimation of the total landing of the species from the NE Atlantic.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for porbeagle in the Northeast Atlantic.

STOCK STATUS: Available information from Norwegian and Faroese fisheries shows that landings declined strongly and these fisheries ceased in the ICES area. These fisheries have not resumed, implying that the stock has not recovered, at least in the areas where those fisheries took place. The available information from the French fishery suggests that CPUE reached a peak in 1994 and afterwards has declined. The CPUE has been stable at a much lower level since 1996.

Porbeagle is subject to the UN agreement on highly Migratory Stocks and the UK Biodiversity priority list. In IUCN, porbeagle is classified as Vulnerable for the depleted unmanaged population in the northeast Atlantic, and Lower Risk (conservation dependent) for the northwest Atlantic, in recognition of the introduction of the US and Canadian Fisheries Management Plans (IUCN 2000).

RECENT MANAGEMENT ADVICE: Given the state of the stock, no targeted fishing for porbeagle should be permitted and by-catch should be limited. Landings of porbeagle should not be allowed.

Porbeagles are particularly vulnerable to fishing mortality, because the population productivity is low (long-lived, slowgrowing, high age-at-maturity, low fecundity, and a protracted gestation period) and they have an aggregating behavior. In the light of this, risk of depletion of reproductive potential is high. It is recommended that exploitation of this species should only be allowed when indicators and reference points for stock status and future harvest have been identified and a management strategy, including appropriate monitoring requirements has been decided upon and is implemented.

STECF COMMENTS: STECF agrees with the ICES advice that no targeted fishing for porbeagle should be permitted. STECF also agrees with ICES that it should be a requirement for all countries to document all incidental by-catches of this species.

To afford the stock maximum protection, STECF **recommends** that there should be no catches of porbeagle from the Northeast Atlantic.

8. Deep Sea Resources

The text in Section 8 remains unchanged from that given in the STECF Consolidated review of advice for 2009 (STECF, 2009, EUR 23630 EN). Advice on deep sea resources is provided every two years and the advice for 2010 was provided in 2008. In view of this, STECF has not attempted to categorise these resources according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

8.1. Deep-water fish (several species) in IVA, IIIa, Vb, VI, VII, VIII, IX, X and XII.

GENERAL COMMENTS AND DESCRIPTION OF FISHERIES

The term ‘deep-water’ is defined by ICES to include waters of depths greater than 400 m. Deep water in the ICES area covers the deep parts of ICES Sub-areas I, II, III, V-X, XII, and XIV. However, some of the species included as deep-water species in the management advice by ICES are also distributed in more shallow waters, e.g. ling and tusk. Other species/stocks, which have similar depth distributions, e.g. anglerfish and Greenland halibut, are already assessed by ICES in area-specific assessment working groups.

Deep-water covers a huge area from the Arctic north to the sub-tropical south. It also covers ridges and underwater seamounts often with a quite unique biology. Productivity is very low in the deep-water. The diversity of deep-water life history strategies is considerable, but many species of fish targeted by fisheries are particularly vulnerable to disturbance because they grow slowly, mature late in life, and form aggregations easily accessible to fisheries. Recovery rates are much slower than in shallower waters. The knowledge of central biological characteristics such as stock identity, migration, recruitment, growth, feeding, maturation, and fecundity of most deep-water species still lags considerably behind that of commercially exploited shelf-based species. Such information is required to expand our understanding of the population dynamics of deep-water fishes, which in turn is required to underpin stock assessments.

Fisheries data including length and age compositions, discards, and cpue, are slowly increasing for deep-water stocks but time-series data are often short and are not available in sufficient spatial resolution for some stocks e.g. orange roughy and alfonosinos. VMS data are not readily available for most fleets.

In many cases, information on stock structure of deep-water species is lacking. This year, ICES provides advice on separate stocks of tusk (*Brosme brosme*) on the basis of new genetic evidence considered in 2007, but for the other species there is no conclusive information on stock structure. In those cases “management units” have been used that have previously been suggested on the basis of distribution, life history and biological parameters, and bathymetrical considerations.

Fisheries on deep-water species have developed rapidly and the resources they exploit are generally especially vulnerable to over-fishing. Within the ICES area species/stocks have been depleted before appropriate management measures have been implemented e.g. orange roughy. It is also of concern that the landings statistics available may not reflect the true scale of the recent fishing activity, especially in waters outside national EEZs.

In ICES Division IVa there is a by-catch of Greater silver smelt (*Argentina silus*) in the industrial trawl fishery. A longline fishery targets tusk (*Brosme brosme*) and ling with forkbeard (*Phycis blennoides*) and grenadier as a by-catch. Some deepwater species are landed as a by-catch in the trawl fisheries targeting anglerfish and Greenland halibut.

In ICES Division IIIa there is a targeted trawl fishery for roundnose grenadier (*Coryphaenoides rupestris*) and greater silver smelt. Several deep-water species are also taken as a by-catch in, for instance, the trawl fisheries for northern shrimp.

In ICES Sub-area V there are trawl fisheries targeting blue ling, redfish species, argentine and orange roughy (*Hoplostethus atlanticus*), which have as by-catch a great number of other deep-water species. There are also traditional longline fisheries for ling and tusk, and trawl and gill net fisheries for Greenland halibut and anglerfish.

In ICES Sub-areas VI and VII there are directed fisheries for blue ling, roundnose grenadier, orange roughy, black scabbardfish and deep-water sharks.

In Sub-area VIII there is a longline fishery, which mainly targets greater forkbeard, and trawl fisheries for hake, megrim, anglerfish and *Nephrops* which have a by-catch of deep-water species.

In ICES Sub-area IX some deep-water species are a by-catch of the trawl fisheries for crustaceans. Typical species are bluemouth (*Helicolenus dactylopterus*), greater forkbeard, conger eel (*Conger conger*), blackmouth dogfish (*Galeus melastomus*), kitefin shark (*Dalatias licha*), gulper shark (*Centrophorus granulosus*) and leafscale gulper shark (*Centrophorus squamosus*). There is a directed longline fishery for black scabbard fish (*Aphanopus carbo*) with a by-catch of the Portuguese dogfish (*Centroscymnus coelolepis*) and leafscale gulper shark (*Centrophorus squamosus*). There is also a longline (Voracera) fishery for *Pagellus bogaraveo*.

In ICES Sub-area X the main fisheries are by handline and longline near the Azores, and the main species landed are red (blackspot) seabream (*Pagellus bogaraveo*), wreckfish (*Polyprion americanus*), conger eel, bluemouth, golden eye perch (*Beryx splendens*) and alfonosino (*Beryx decadactylus*). At present the catches of

kitfin shark are made by the longline and handline deepwater vessels and can be considered as accidental. There are no vessels at present catching this species using gillnets. Outside the Azorean EEZ there are trawl fisheries for golden eye perch, orange roughy, cardinal fish (*Epigonus telescopus*), black scabbard fish, and wreckfish.

In ICES Sub-area XII there are trawl fisheries on the mid-Atlantic Ridge for orange roughy, roundnose grenadier, and black scabbard fish. There is a multispecies trawl and longline fishery on Hatton Bank, and some of this occurs in this sub-area, some in Sub-area VI. There is considerable fishing on the slopes of the Hatton Bank, and effort may be increasing. Smoothheads (*Alepocephalus* species.) were previously usually discarded but now feature to a greater extent in the landings statistics.

In ICES Sub-area XIV there are trawl and longline fisheries for Greenland halibut (*Rheinhardtius hippoglossoides*) and redfish that have by-catches of roundnose grenadier, roughhead grenadier (*Macrourus berglax*) and tusk.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for these stocks.

STOCK STATUS: No update or benchmark stock assessments could be made in 2008, and information on exploitation rates remains uncertain. The information on stock status of deep-water species derives from different sources. In many cases the main source of information is catch rates from the commercial fisheries, although in some cases there is also information from research surveys. A number of research surveys have been initiated in recent years, and these are expected to aid the future knowledge on these species.

MANAGEMENT MEASURES Some fisheries are regulated by unilateral or internationally agreed TACs and these may have reduced exploitation /curbed expansion.

In the NEAFC regulatory area, NEAFC has in recent years introduced measures requiring that effort should be reduced by a total of 35% by 2008 and the EU introduced measures in 2006 that set effort for vessels holding deepwater licences to 80% of the 2003 level.

RECENT MANAGEMENT ADVICE: For a number of deep-water and elasmobranch stocks, the new information available since the last advice in 2006 is too sparse to warrant a new advice. This generally refers to situations where only landings information is available from which stock status cannot be derived. In those cases, ICES presents the updated (landings) information but reiterates the advice provided in 2006 and does not provide the full descriptions of the background of the fisheries and the assessment. To improve the knowledge base on these stocks, it is vital to develop indicators of abundance (i.e. surveys, cpue) and/or indicators of exploitation (i.e. fishing effort).

Deep-water stocks have previously been classified by ICES (ICES, 2005) on the basis of longevity and growth rate.

Only in very rare cases did ICES have information on indicators for exploitation pressure (e.g. fishing mortality). The approach to the ICES advice on deep-water species has been largely driven by the interpretation of the available abundance indicators (cpue or survey indicators) and the classification according to life history parameters:

- For species in cluster 1 (highly vulnerable)
 - When cpue information shows declines and life history information indicates that species are highly vulnerable, ICES generally recommends no catches of that species.
- For species in cluster 2 (less vulnerable)
 - When recent cpue is much lower than historical cpue, ICES generally recommends a reduction in catch or a low catch, maintaining that level until there is sufficient information that the species can sustain higher exploitation.
 - When cpue information shows no clear trend, ICES generally recommends recent average catches.
 - When surveys show a clear increase in abundance, ICES generally recommends no increase in current catches.

ICES reiterates that effort should be a driving management tool in these mixed deep-water fisheries. However, in the absence of pressure indicators, ICES has attempted to interpret the available landings and cpue data in a way that could be useful even when effort information is not available. The perceived tendency of the stock indicators (cpue, surveys) has been used to argue for the suggested changes to the landings. While acknowledging that a one-to-one relationship between catches and effort is unlikely ICES, in the absence of information, considers that the suggested reductions in landings would result in reductions of effort.

The ICES advice for deep-water species is provided every second year. The advice is applicable for 2009 and 2010.

These have been supplemented by new advice arising from recent requests to ICES made by NEAFC. New ICES advice on deep-water species will be provided in 2010.

STECF COMMENTS: STECF agrees with the ICES recommendation and considers the proposals as a constructive way forward in the light of uncertainties on the states of these stocks and the likely risks to them. STECF notes that appropriate sustainable exploitation rates for most deepwater species have not been determined and the risks associated with current fishing effort are not quantified. Given the biology of many of these species, very low exploitation rates or zero fishing are likely to be advised in most cases.

STECF once again reiterates its comment that management measures based on effort/fleet regulation are a more appropriate long-term approach for management of these fisheries and consequently fisheries based advice, in addition to that currently given, has value. STECF notes that in its advice for some species, ICES groups together stock components that are characterised by a shortage of data rather than on a biological basis. STECF suggests that in order to provide rational fisheries based advice, there is a need to define groupings, which have a spatial coherence that facilitates management. STECF further suggests that continued efforts should be made to define biological units based on, for example, genetic studies.

ICES has commented in 2006 on the precautionary reference points used for some stocks. Reference points that were previously suggested were: $U_{lim} = 0.2 * U_{MAX}$ and $U_{pa} = 0.5 * U_{MAX}$ (where U is the index of exploitable biomass). The ICES SGPA and NAFO proposed these reference points in 1997 for use in data poor situations. However, for most stocks ICES does not consider the available cpue series as suitable for defining U_{MAX} because the series are too short and U_{MAX} is not an index virgin biomass. STECF agrees that this is a valid point but in a data-poor situation and in the precautionary context, these reference points are likely to be the best available for these stocks, even though they may underestimate depletion/overestimate recovery in relation to actual U_{MAX} .

STECF notes that in any scheme to reduce existing fisheries in the short-term, attention would need to be paid to potential effort displacement into other neighbouring fisheries on the continental shelf. STECF further notes that several of these deep-water fisheries take place in international waters outside national or EU jurisdiction. Hitherto this has rendered it difficult to enforce management measures for these fisheries.

8.2. Alfonsinos/Golden eye perch (*Beryx spp.*)

FISHERIES: The section deals with two species, *Beryx splendens* and *B. decadactylus*. Most of the landings of *Beryx* are from hand-lines and long-lines within the Azorean EEZ of Sub-area X and by trawl outside the EEZ on the Mid-Atlantic Ridge. The trawl fishery landings refer to both species combined. Under reporting of catches from international waters is suspected. Alfonsinos aggregate in shoals, often associated with seamounts, and the fisheries have high catch rates once the shoals are located. Localized sub-units of the population can be quickly depleted by fisheries, even within a single season. In various seamounts of ICES Sub-area X there are some indications that the stocks were intensely exploited during the last decade.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

STOCK STRUCTURE: The stock structure of both species is uncertain. They are distributed over a wide area, which may be composed of several populations.

REFERENCE POINTS: No precautionary reference points have been proposed for the stock(s) of Alfonsino/golden eye perch in the NE Atlantic, due to the lack of appropriate data.

STOCK STATUS: Assessment data are sparse and reliable assessments are not possible at present.

RECENT MANAGEMENT ADVICE: Due to their spatial distribution associated with seamounts, their life history and their aggregation behaviour, alfonosinos/golden eye perch are easily overexploited by trawl fishing; they can only sustain low rates of exploitation. Fisheries on such species should not be allowed to expand above current levels unless it can be shown that such expansion is sustainable. To prevent wiping out entire subpopulations that have not yet been mapped and assessed the exploitation of new seamounts should not be allowed.

STECF COMMENTS: STECF agrees with the ICES advice, and notes that there may be a need to harmonise management measures in Sub-area X with those for red (blackspot) seabream.

8.3. Ling (*Molva molva*)

FISHERIES: Ling is primarily fished in the depth range 200-500 m, though it is also found in shallower depths. This species does not have such extreme low productivity and high longevity as typical deep-water species, though specific data for many areas are lacking. The major fisheries are the longline and gillnet fisheries, but there are also by-catches in other gears, i.e. trawls and handline.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

STOCK STRUCTURE: There is insufficient scientific information to establish the extent of putative stocks; however, ling may be sufficiently isolated at separate fishing grounds to be considered as individual management units. On this basis ICES advice is presented for the following management units:

- Divisions I and II (Arctic)
- Va (Iceland)
- Vb (Faroes)
- IIIa, IVa, VI, VII, VIII, IX, XII, and XIV (other areas).

8.3.1. Ling (*Molva molva*) in Divisions I and II (Arctic)

REFERENCE POINTS: No precautionary reference points have been established.

STOCK STATUS: Commercial cpue for Norwegian longliners has in recent years been lower than observed in the 1970s and 80s. There is some evidence of a recent increase.

RECENT MANAGEMENT ADVICE: Cpue in Areas I and II has been at a reduced level. ICES reiterates the advice to constrain catches to 6,000 t and to collect information that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice, but notes there may be a need to harmonise management measures for ling and tusk in this area.

8.3.2. Ling (*Molva molva*) in Va (Iceland)

REFERENCE POINTS: In common with other deep-water stocks, U_{lim} has previously been proposed at 0.2* virgin biomass and U_{pa} at 0.5* virgin biomass (ICES, 1998). In the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be calculated.

STOCK STATUS: A survey biomass index shows increasing abundance since 2000. The levels are currently at a similar high level as in the start of the series. There are indications that fishing mortality may have declined in recent years.

RECENT MANAGEMENT ADVICE: Surveys indicate that the overall biomass is increasing. Landings have also increased. ICES recommends constraining catches to 7500 t (recent average 2006–2007) and to collect information that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice.

8.3.3. Ling (*Molva molva*) in Vb (Faroes)

REFERENCE POINTS: In common with other deep-water stocks, U_{lim} has previously been proposed at 0.2* virgin biomass and U_{pa} at 0.5* virgin biomass (ICES, 1998). In the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be calculated.

STOCK STATUS: Abundance indices suggest that ling in the management unit Vb is stable at a low level compared with the 1970s and 80s.

RECENT MANAGEMENT ADVICE: Cpue in Area Vb has been at a reduced level. ICES reiterates the advice that effort should not be allowed to increase and that information should be collected that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice.

8.3.4. Ling (*Molva molva*) in IIIa, IVa, VI, VII, VIII, IX, XII, and XIV (Other areas)

REFERENCE POINTS: In common with other deep-water stocks, U_{lim} has previously been proposed at 0.2* virgin biomass and U_{pa} at 0.5* virgin biomass (ICES, 1998). In the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be calculated.

STOCK STATUS: The cpue series of the main fleet in Divisions IVa, VIa, and VIb suggest that the abundance has remained at a reduced level after the decline in the 1970s to 1990s.

RECENT MANAGEMENT ADVICE: Cpue in these areas has been at a reduced level. ICES reiterates the advice to constrain catches to 10,000 t and to collect information that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice but notes there is a need to harmonise management measures for ling and tusk in these other areas. STECF considers that there is no biological basis to consider ling in these areas as a unit stock and should not be considered as a single management unit.

8.4. Blue Ling (*Molva dypterygia*).

FISHERIES: The majority of landings are from the Norwegian coast (II), Iceland (Va), Faroes (Vb), west of Scotland and Rockall Trough (VI) and the Mid-Atlantic Ridge and Hatton Bank (XII). Landings from the west of Ireland and Western Approaches (VII) and further south are very small. A major part of this fishery is on spawning aggregations. Landings from Division IIa are mainly catches in a gillnet fishery off mid-Norway, elsewhere this species is taken mainly as by-catch in trawl fisheries.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No reliable analytical assessments are available.

STOCK STRUCTURE: There is insufficient scientific information to establish the extent of putative stocks; however, blue ling may be sufficiently isolated at separate fishing grounds to be considered as individual management units. On this basis advice is presented for the following management units:

- Subdivisions Va and XIV (Iceland and Reykjanes ridge);
- Subdivisions Vb, VI, and VII (Faroes Rockall and Celtic shelf); and
- Subdivisions I, II, IIIa, IVa, VIII, IX, and XII.

The latter grouping is a combination of isolated fishing grounds and these areas are grouped thus due to lack of data. Blue ling is more vulnerable to over-exploitation than ling due to a slower growth rate and higher age at first maturity. It is particularly susceptible to rapid local depletion due to its highly aggregating behaviour during spawning. Ageing is a problem in this species, and thus age-structured analytical assessments are unlikely in the short-term.

8.4.1. Blue Ling (*Molva dypterygia*) in Va and XIV

REFERENCE POINTS: In common with other deep-water stocks, U_{lim} has previously been proposed at $0.2 \times$ virgin biomass and U_{pa} at $0.5 \times$ virgin biomass (ICES, 1998). In the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be calculated.

STOCK STATUS: Cpue of blue ling in Va and XIV has steadily declined from 1991 to 2000 and has remained at a low level since then.

RECENT MANAGEMENT ADVICE: There should be no directed fisheries and measures should be implemented to minimise catches in mixed fisheries. Blue ling is susceptible to sequential depletion of spawning aggregations and closed areas to protect spawning aggregations should therefore be maintained and expanded where appropriate.

STECF COMMENTS: STECF agrees with the ICES advice.

8.4.2. Blue Ling in Vb, VI and VII

REFERENCE POINTS: In common with other deep-water stocks, U_{lim} has previously been proposed at $0.2 \times$ virgin biomass and U_{pa} at $0.5 \times$ virgin biomass (ICES, 1998). In the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be calculated.

STOCK STATUS: Cpue information suggests that the abundance of blue ling remains at a low level.

RECENT MANAGEMENT ADVICE: There should be no directed fisheries for blue ling in Subdivisions Vb, VI and VII and measures should be implemented to minimise catches in mixed fisheries. Blue ling is susceptible to sequential depletion of spawning aggregations and closed areas to protect spawning aggregations should therefore be maintained and expanded where appropriate.

STECF COMMENTS: STECF agrees with the ICES advice. To discourage any directed fishing on blue ling, STECF **recommends** the following:

- the current trip limit of 25 t per trip should be substantially reduced.
- closure of spawning areas

The additional information available following the ICES response to the NEAAFC request (ICES advice 2008, book 9, section 9.3.2.7) on spawning aggregations of blue ling is sufficient to identify specific spawning aggregations on Hatton Bank, Rosemary Bank, Lousy Bank and the continental slope to the NW of Scotland (see section 11.1 of the STECF/PLEN-08-02 report).

8.4.3. Blue ling (*Molva dypterygia*) in other areas (I, II, IIIa, IVa, VIII, IX, and XII)

REFERENCE POINTS: No precautionary reference points have been established for this species in these areas.

STOCK STATUS: Trends in landings suggest serious depletion, at least in Sub-areas IIa and IIb.

RECENT MANAGEMENT ADVICE: There should be no directed fisheries and management measures should be taken to minimise the by-catch of this species in mixed fisheries. Blue ling is susceptible to sequential depletion of spawning aggregations and closed areas to protect spawning aggregations should therefore be maintained and expanded where appropriate.

STECF COMMENTS: STECF agrees with the ICES advice. STECF considers that there is no biological basis to consider blue ling in these areas as a unit stock and should not be considered as a single management unit.

8.5. Tusk (*Brosme brosme*)

FISHERIES: Tusk is primarily fished in the depth range 200-500 m, though it is also found at shallower depths. Tusk is more vulnerable to overexploitation than ling due to a slower growth rate and higher age at first

maturity. The majority of landings are from ICES sub-areas IIa, IIIa, from along the Norwegian coast of IVa, Va (around Iceland), and Vb (around Faroe Islands). This species is taken mainly in long line fisheries, and most of the catches are by-catches in ling fisheries. Tusk is also taken as by-catch in bottom trawl fisheries.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

STOCK STRUCTURE: This year, ICES provided advice on separate stocks of tusk on the basis of new genetic evidence considered in 2007. On this basis advice is presented for the following revised management units:

- I and II (Arctic)
- Division Va and Subarea XIV
- The Mid-Atlantic Ridge (Division XII excluding XIIb)
- Subarea VIb (Rockall)
- IIIa, IV, Vb, VIa, VII, VIII, IX, XIIb, . (This latter grouping is a combination of isolated fishing grounds and these areas are grouped due to their mutual lack of data.)

8.5.1. Tusk (*Brosme brosme*) in Divisions I and II (ARCTIC)

REFERENCE POINTS: In common with other deep-water stocks, U_{lim} has previously been proposed at 0.2* virgin biomass and U_{pa} at 0.5* virgin biomass (ICES, 1998). In the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be calculated.

STOCK STATUS: Tusk has been exploited in Sub-areas I and II for centuries, but landings increased from the 1950s onwards. The state of the stock is unknown. CPUE has in recent years been well below historical levels.

RECENT MANAGEMENT ADVICE: Cpue in Areas I and II has been at a reduced level. ICES reiterates the advice to constrain catches to 5,000 t and to collect information that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice, but notes there is a need to harmonise management measures for ling and tusk in this area.

8.5.2. Tusk (*Brosme brosme*) in Division Va and Subarea XIV

REFERENCE POINTS: In common with other deep-water stocks, U_{lim} has previously been proposed at 0.2* virgin biomass and U_{pa} at 0.5* virgin biomass (ICES, 1998). In the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be calculated.

STOCK STATUS: The state of the stock is unknown. Recruitment has increased from a low level in 1995. There are indications that fishing mortality may have declined in recent years.

RECENT MANAGEMENT ADVICE: Surveys indicate that the overall biomass is increasing but consists mostly of small individuals. ICES reiterates the earlier advice to constrain catches to 5000 t (average 2001–2004) to allow the juveniles to recruit to the adult stock. ICES also recommends collecting information that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice.

8.5.3. Tusk (*Brosme brosme*) on the Mid-Atlantic Ridge (Division XII excluding XIIb)

REFERENCE POINTS: Reference points for this stock have not been calculated. Reference points that were previously suggested for tusk would be based on unexploited abundance; however, the data to calculate this point do not exist.

STOCK STATUS: Fisheries in this area take very small catches of tusk. There is no information on the state of the stock.

RECENT MANAGEMENT ADVICE: Fisheries on tusk should be accompanied by programmes to collect data on both target and by-catch fish. Fisheries should not be allowed to expand unless there is information that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice:

8.5.4. Tusk (*Brosme brosme*) in Subarea VIb (Rockall)

REFERENCE POINTS: Reference points for this stock have not been calculated. Reference points that were previously suggested for tusk would be based on unexploited abundance; however, the data to calculate this point do not exist.

STOCK STATUS: The state of the stock is unknown. Cpue does not indicate apparent changes under the historic catch regime.

RECENT MANAGEMENT ADVICE: Cpue in Rockall does not indicate any clear trends. Therefore, recent levels of catches do not appear to have had a negative impact. ICES recommends that catches should be constrained to 530 t (average 2003–2007) and to collect information that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice.

8.5.5. Tusk (*Brosme brosme*) in IIIa, IV, Vb, VIa, VII, VIII, IX, XIIb (Other areas)

REFERENCE POINTS: Reference points for this management unit have not been calculated. Reference points that were previously suggested for tusk would be based on unexploited abundance; however, the data to calculate these points do not exist.

STOCK STATUS: Cpue indicators for Divisions IVa, VIa, and Vb suggest that tusk abundance has been at a reduced level but may be increasing.

RECENT MANAGEMENT ADVICE: Cpue in these areas has been at a reduced level but may have been increasing in recent years. Because of these uncertainties, ICES recommends to constrain catches to 5000 t and to collect information that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice but notes there is a need to harmonise management measures for ling and tusk in these areas. STECF considers that there is no biological basis to consider tusk in these areas as a unit stock and should not be considered as a single management unit.

8.6. Greater silver smelt or argentine (*Argentina silus*)

FISHERIES: Argentine is primarily fished in the depth range 100 to 700 m. The majority of landings are from ICES sub-areas IIa, IIIa, IVa along the Norwegian coast, Va (around Iceland), and Vb (around Faroe Islands). This species is taken mainly in long line fisheries, and most of the catches are by-catches in ling fisheries. This species is also taken as by-catch in bottom trawl fisheries. The Norwegian fishery accounts for the more than 50% of total catches.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. No reliable analytical assessment is available.

STOCK STRUCTURE: There is insufficient scientific information to establish the extent of putative stocks; however, argentine may be sufficiently isolated at separate fishing grounds to be considered as individual management units. On this basis advice is presented for the following management units:

- Sub-area Va (Iceland); and
- Sub-areas I, II, IIIa, IVa, Vb, VI, VII, VIII, IX, and XII (other areas).

The latter grouping is a combination of isolated fishing grounds and these areas are thus grouped due to their mutual lack of data.

8.6.1. Greater silver smelt (*Argentina silus*) in Va

REFERENCE POINTS: No precautionary reference points have been established for stocks of this species.

STOCK STATUS: The status of greater silver smelt in Subdivision Va is unknown.

RECENT MANAGEMENT ADVICE: Due to its low productivity greater silver smelt can only sustain low rates of exploitation. Fisheries on such species should always be accompanied by programmes to collect data on both target and by-catch fish. The fishery should not be allowed to expand unless it can be shown that it is sustainable.

STECF COMMENTS: STECF agrees with the comments of ICES, but notes there may be a need to harmonise management measures with those for redfish and blue whiting.

8.6.2. Greater silver smelt (*Argentina silus*) in other areas (I, II, IIIa, IV, Vb, VI, VII, VIII, IX, X, XII and XIV)

REFERENCE POINTS: No precautionary reference points have been established for stocks of this species.

STOCK STATUS: The state of the silver smelt resource in other areas is unknown. Catches increased considerably in recent years, but were reduced in 2003 in some areas, partly due to introduction of TAC management in EU waters. In Subarea VI the frequency of old fish (20+) in the catches declined significantly after a few years of target fisheries. Such changes suggest high exploitation rates.

RECENT MANAGEMENT ADVICE: Due to its low productivity greater silver smelt can only sustain low rates of exploitation. Fisheries on such species should always be accompanied by programmes to collect data on both target and by-catch fisheries. The fishery should not be allowed to expand unless it can be shown that it is sustainable.

STECF COMMENTS: STECF agrees with the comments from ICES, but notes there may be a need to harmonise management measures with those for roundnose grenadier in IIIa and small-mesh bottom trawl industrial fisheries mainly in IVa.

8.7. Black scabbardfish (*Aphanopus carbo*)

FISHERIES: Black scabbardfish is caught in two very different fisheries: (1) in waters off Mainland of Portugal (Division IXa) and (2) to the west of British Isles. In the waters off Mainland of Portugal it is taken in a targeted artisanal longline fishery and CPUE data have been relatively stable over the years. To the west of the British Isles it is taken in a mixed species, mainly French trawl fishery along with roundnose grenadier and sharks.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

STOCK STRUCTURE: The stock structure is uncertain. This section deals with a species distributed over a wide area which may be composed of several populations. Three management units are considered:

- northern (Sub-areas V, VI, VII, and XIIb);
- southern (Sub-areas VIII and IX).
- Other areas (Sub-areas I, II, IIIa, IV, X, and XIV)

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: The status of the species is unknown. In the northern area, indicators show a decline in abundance since 1990. In the southern area indicators have been relatively stable during the past decade. In the

other areas only very small catches have been taken. Due to its low productivity, black scabbardfish can only sustain low rates of exploitation.

RECENT MANAGEMENT ADVICE: Despite the lower landings in recent years, cpue in Areas Vb, VI, VII, and XIIb has declined to about 20% of its initial level. ICES recommends that catches should be constrained to 2000 t (50% of the level before the expansion of the fishery, 1993–1997). The fishery should not be allowed to expand unless it can be shown that it is sustainable.

Cpue in Subareas VIII and IX does not indicate any clear trends, but no information is available before 1996. Recent levels of catches do not appear to have had a negative impact. ICES recommends that catches in these areas should be constrained to 2800 t (average 2003–2007) and to collect information that can be used to evaluate a long-term sustainable level of exploitation.

The fishery in other areas should not be allowed to expand unless it can be shown that it is sustainable.

STECF COMMENTS: STECF **recommends** that in order to reverse the observed decline in the stock of black scabbard in Vb, VI, VII and XIIb, a significant reduction in fishing mortality is required. STECF advises that if fully enforced, the measures advised by ICES may achieve such a reduction.

STECF **recommends** that an attempt be made to harmonise management measures for black scabbard in Vb, VI, VII and XIIb with those for other species taken in the mixed trawl fishery in these areas, particularly deep-water sharks and roundnose grenadier.

For black scabbard in other areas, STECF agrees with the ICES advice.

8.8. Greater forkbeard (*Phycis blennoides*)

FISHERIES: The landings of greater forkbeard are mainly by-catch from both trawl and longline fisheries. Landings from Sub-areas VI and VII comprise around the 85% of the total landings of this species in the ICES area. Fluctuations in landings are probably the result of changing effort on different target species and/or market prices. The increase in landings in Sub-areas VIII and IX probably represents a directed longline fishery.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: There is no information available that allows for evaluation of the stock trends. The state of the stock is unknown.

RECENT MANAGEMENT ADVICE: Fisheries on greater forkbeard should be accompanied by programmes to collect data. The fishery should not be allowed to expand unless it can be shown that it is sustainable.

STECF COMMENTS: STECF agrees that fisheries catching Greater forkbeard should not be allowed to expand unless there is information that can be used to evaluate a long-term sustainable level of exploitation.

8.9. Orange roughy (*Hoplostethus atlanticus*)

FISHERIES: The directed fishery for orange roughy aggregations west of Ireland in Sub-area VII has now ceased. The fishery in Sub-area VI has decreased dramatically since the depletion of the main aggregation on the Hebrides Terrace Seamount in the early 1990s and there has not been a major directed fishery since 2002. Faroese fisheries in Sub-areas VI, XII, and X have ceased and so has an Icelandic fishery in Division Va.

. In Sub-area XII, the Faroes dominated the fishery throughout the 1990s, with small landings by France. In recent years, New Zealand and Ireland have targeted orange roughy in this area. There are many areas of the Mid-Atlantic Ridge where aggregations of this species occur, but the terrain is very difficult for trawlers.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

STOCK STRUCTURE: It is not known if individual aggregations are reproductively distinct.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: Orange roughy form discrete aggregations, which are susceptible to sequential depletion.

Orange roughy catches in Subarea VI increased rapidly and subsequently dropped. Orange roughy cpue in Subarea VI has shown a strong declining trend since early 1990s. It is presumed that the aggregations were fished out. Landings have declined to low levels in each management area (VI, VII, and other).

Orange roughy fisheries in Subarea VII have exhibited a similar pattern to that in VI. High catches have not been sustained by individual fleets and have dropped to low levels, suggesting sequential depletion. Orange roughy cpue in Subarea VII has shown a strong declining trend since the early 1990s. It is unclear if there are unfished aggregations remaining in Subarea VII.

RECENT MANAGEMENT ADVICE: Orange roughy can only sustain very low rates of exploitation. Currently, it is not possible to manage a sustainable fishery for this species. ICES recommends no directed fishery for this species. By-catches in mixed fisheries should be as low as possible.

STECF COMMENTS: STECF agrees with the ICES advice.

8.10. Roundnose grenadier (*Coryphaenoides rupestris*)

FISHERIES: The majority of international landings are from the Skagerrak (III), Faroes (Vb), west of Scotland and Rockall Trough (VI), west of Ireland and Western Approaches (VII) and the Mid-Atlantic ridge and western Hatton Bank (XII). In most areas, roundnose grenadier is the target species of mixed trawl fisheries.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

STOCK STRUCTURE: This section deals with a species distributed over a wide area, which may be composed of several populations. The scientific basis for stock identification is uncertain. The Wyville-Thomson Ridge and fjord sills, between Western Scotland and the edge of the North Sea slope, could be natural physical boundaries. It is therefore considered that the northern North Sea and the Norwegian Deep could represent a separate unit. The roundnose grenadier on the Mid-Atlantic Ridge and the Hatton Bank are separated by a major oceanic basin and may constitute separate units. This would indicate that the units could be split as:

- Divisions IIIa;
- Divisions Vb, VI, VII, and XIIb (Hatton bank);
- Mid-Atlantic ridge (Subdivisions Xb, XIIc, Va1, XIIa1, and XIVb1) ;
- All other areas (I, II, IV, Va2, VIII, IX, XIVa, XIVb2).

8.10.1. Roundnose grenadier (*Coryphaenoides rupestris*) in Division IIIa

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: It has not been possible to assess the status of the stock. However, as scientific investigations have indicated slow growth of this species, the drastic increase in exploitation of this stock during the years 2003–2005 gave rise for serious concern, even if no clear signs of the increasing fishing pressure were observed in recent years. No directed fishery has taken place since 2007. A decrease in mean length in the catch from 1987 to 2004 and 2005 indicates heavy exploitation on this stock.

RECENT MANAGEMENT ADVICE: Due to its low productivity, roundnose grenadier can only sustain low rates of exploitation. ICES reiterates the advice to constrain catches to 1000 t, which corresponds to the catch level before the expansion of the fishery (1988–1991). The fishery should not be allowed to expand again unless it can be shown that it is sustainable.

STECF COMMENTS: STECF agrees with the ICES advice.

8.10.2. Roundnose grenadier (*Coryphaenoides rupestris*) in Subareas VI and VII and in Divisions Vb and XIIb

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: Overall the stock status is uncertain, but there is some evidence of biomass depletion for Vb, VI and VII.

Survey data from the west of Scotland (Division VI) indicate that grenadier does not occur in the shallower waters. Length distribution of French landings indicates a change towards smaller fish. The results of an exploratory age-structured assessment of the stock in Subareas VI and VII and in Division Vb indicate that the total biomass has declined consistently since 1996.

RECENT MANAGEMENT ADVICE: Due to its low productivity, roundnose grenadier can only sustain low rates of exploitation. Cpue in the areas has been at a reduced level. ICES recommends that catches should be constrained to 6000 t (50% of the level before the expansion of the fishery, 1990–1996). The fishery should not be allowed to expand unless it can be shown that it is sustainable.

STECF COMMENTS: STECF **recommends** that in order to reverse the observed decline in the stock of roundnose grenadier in Vb, VI, VII and XIIb, a significant reduction in fishing mortality is required. STECF notes the dramatic decline in the landings of roundnose grenadier from this area from a level of 50,000 t in 2001 to 9,000 t in 2006. The reported landings for 2007 are about 3,000 t.

To ensure a significant reduction in fishing mortality STECF advises that it may be necessary to ensure that catches are lower than the TAC advised by ICES.

Given that roundnose grenadier is taken in a deepwater mixed fishery, there is a need to harmonise management measures to account for the management requirements for other species taken.

8.10.3. Roundnose grenadier (*Coryphaenoides rupestris*) on the Mid-Atlantic ridge (Xb, XIIc, Va1, XIIa1, and XIVb1)

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: The state of the stock is uncertain. Soviet data suggested a high biomass in the 1970–1980s. Cpue data suggest an overall decline in catch rates after the 1970s (Figure 9.4.15.3.1). A Russian trawl acoustic survey in 2003 showed relatively low biomass of the pelagic component of the stock, an increasing depth of the aggregations, and a higher number of small immature fish.

RECENT MANAGEMENT ADVICE: Due to its low productivity, roundnose grenadier can only sustain low rates of exploitation. Fisheries on such species should always be accompanied by programmes to collect data on both target and by-catch fisheries. The fishery should not be allowed to expand from the current low level unless it can be shown that it is sustainable.

STECF COMMENTS: STECF **recommends** that fisheries on the mid-Atlantic ridge should not be allowed to expand unless there is information that can be used to evaluate a long-term sustainable level of exploitation for roundnose grenadier.

8.10.4. Roundnose grenadier (*Coryphaenoides rupestris*) in all other areas. (I, II, IV, Va2, VIII, IX, XIVa, and XIVb2)

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS: This assessment unit consists of a number of discrete areas in which only very small catches of roundnose grenadier occur.

RECENT MANAGEMENT ADVICE: Due to its low productivity, roundnose grenadier can only sustain low rates of exploitation. Fisheries on such species should always be accompanied by programmes to collect data on both target and by-catch fisheries. The fishery should not be allowed to expand unless it can be shown that it is sustainable.

STECF COMMENTS: STECF **recommends** that deepwater mixed fisheries in I, II, IV, Va₂, VIII, IX, XIVa, and XIVb₂ should not be allowed to expand unless there is information that can be used to evaluate a long-term sustainable level of exploitation for roundnose grenadier.

8.11. Red (blackspot) seabream (*Pagellus bogaraveo*)

FISHERIES: There is a directed hand-line and longline fishery in Sub-areas IX and X. Red seabream have been caught in hook and line fisheries off the Azores since the 16th Century. There are now directed artisanal hand-line as well as longline fisheries in area Xa₂. Historically, improvements in fishing technology have taken place in the directed hand-line and longline fisheries. These include the introduction of bottom longlines and bigger fishing vessels. The resulting improvement on fishing efficiency has not been quantified. Red seabream is caught by Spanish and Portuguese fleets in Sub-area IX. The Spanish artisanal longline fishery targeting red sea began in early 1980s. After 1997 there was a serious decline in landings. In Sub-areas VI, VII and VIII Red seabream appears as by-catch in the longline and trawl fisheries for hake, megrim, anglerfish, and *Nephrops*.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

STOCKS STRUCTURE: The stock structure is uncertain. This section deals with a species distributed over a wide area, which may be composed of several populations. Three units are considered:

- Sub-areas VI, VII, and XII;
- Sub-area IX;
- Sub-area X.

This management unit division is supported by information on genetics and tagging.

REFERENCE POINTS: No precautionary reference points have been established for the stock(s) of this species.

STOCK STATUS (ALL STOCKS):

Red seabream in VI, VII, and VIII appears to be severely depleted based on historical catches.

Red seabream in Subarea IX is depleted and there is no evidence of a significant recovery as a result of the local recovery plan in Spanish waters of the Strait of Gibraltar.

The status in Subarea X is uncertain but there are signs of increases in indices of abundance from surveys. The cpue in the fishery is stable. It is possible that sequential depletion of local populations may occur and this may contribute to the stability of the commercial cpue series.

RECENT MANAGEMENT ADVICE: Catches in Subareas VI, VII, and VIII have been very low for the last 20 years and ICES recommends that the fishery should not be allowed to expand unless it can be shown that it is sustainable.

ICES recommends that catches in Areas IXa and Xa should be constrained to recent average catches (2003–2007) of 500 t in Area IXa and 1050 t in Area Xa and to collect information that can be used to evaluate a long-term sustainable level of exploitation.

STECF COMMENTS: STECF agrees with the ICES advice and notes that studies focussing on defining the spatial distribution of juveniles should be carried out with the aim of implementing management measures to protect juveniles and to conserve the proportion of males in the populations (which may require increasing minimum landing sizes in all areas to 35 cm). In Sub-area IX, the local technical measures relating to the Regional Recovery Plan for this species should be maintained/improved.

8.12. Portuguese dogfish (*Centroscymnus coelolepis*) in the north-east Atlantic

FISHERIES: Portuguese dogfish are caught in virtually all deep-water fisheries in the NE Atlantic although catch data is patchy and incomplete. French trawlers, UK and German longliners and gillnetters in VI and VII are the fleets targeting this species. These fisheries began in 1991 and before that the species was not exploited. There are also directed longline fisheries in VIII and IX and some by-catches from XII. Landings of this species have been routinely grouped together with Leafscale gulper shark and reported as siki. Combined siki landings began in 1988 (although an unknown quantity is likely to have been discarded prior to this) and increased rapidly to over 8000 tonnes in 1997. Since 1997 landings have fluctuated with an overall upward trend, reaching a maximum of over 10,000 tonnes in 2003. Since 2003, reported landings have declined due to stock depletion and the introduction and gradual reduction in EU TACs and quotas in response to ICES advice, which in recent years has been for a zero TAC. However, deep-water sharks continue to be taken as a by-catch in a mixed deep-water trawl fishery in Vb, VI and VII and in a long-line fishery in Sub-area IX.

SOURCE OF MANAGEMENT ADVICE: The main advisory body is ICES. No analytical assessment was carried out in 2008. The assessment is based on commercial CPUE trends and survey trends. Landings data on these species remain very problematical and, in many cases, reliable data are only available for combined siki sharks. Many countries continue to report landings in amalgamated categories such as various sharks N.E.I. Retrospective splitting of the data into species categories and reconstruction of historic data from mixed categories is based on limited information and is problematic.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this species. In common with other deep-water species, U_{lim} has previously been proposed at $0.2 \times$ virgin biomass and U_{pa} at $0.5 \times$ virgin biomass (ICES, 1998) but in the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be estimated.

STOCK STATUS: There is insufficient information to separate the landings of Portuguese dogfish *Centroscymnus coelolepis* and leafscale gulper shark *Centrophorus squamosus*. Total international landings of the combined species have steadily increased to around 11 000 t in 2003 and have rapidly declined after 2003 to the lowest levels since the fishery started. Substantial declines in cpue series for the two species in Subareas V, VI, and VII suggest that both species are severely depleted and that they have been exploited at unsustainable levels. In Division IXa, lpue series are stable for leafscale gulper shark and declining for Portuguese dogfish.

RECENT MANAGEMENT ADVICE: Due to its very low productivity, Portuguese dogfish and leafscale gulper shark can only sustain very low rates of exploitation. The rates of exploitation and stock sizes of deepwater sharks cannot be quantified. However, based on the cpue information, Portuguese dogfish and leafscale gulper shark are considered to be depleted. Given their very poor state, ICES recommends a zero catch of Portuguese dogfish and leafscale gulper shark.

STECF COMMENTS: STECF agrees with the ICES advice for Portuguese dogfish and leafscale gulper shark.

STECF also **recommends** that EU fisheries exploiting deepwater sharks should not proceed until sustainable exploitation rates for deepwater sharks have been determined.

STECF further advises that in order to maximise protection of deep-water sharks, the gill netting ban introduced in 2006 (EC council regulation 51/2006 Annex III) in waters deeper than 600m should be maintained. STECF supports the proposal to extend the gill net ban to other areas (Council regulation (EC) 40/2008, Annex III)

8.13. Leaf-scale gulper shark (*Centrophorus squamosus*) in the north-east Atlantic

FISHERIES: Leaf-scale gulper shark are caught in virtually all deep-water fisheries in the NE Atlantic. Catch data is patchy and incomplete. French trawlers in VI and VII target this species. Gill-net vessels registered in the UK (England and Wales), UK (Scotland) and Germany, target this and other deepwater species since the mid-1990s and takes place mainly west of the British Isles (Sub-areas VI and VII). There are also directed longline fisheries in VIII and IX and some by-catches from XII. Landings of this species have been routinely grouped together with Portuguese dogfish and reported as siki. Combined siki landings began in 1988 (although an unknown quantity is likely to have been discarded prior to this) and increased rapidly to over 8000 tonnes in 1997. Since 1997 landings have fluctuated with an overall upward trend, reaching a maximum of over 10 000 tonnes in 2003. Since 2003, reported landings have declined due to stock depletion and the introduction and gradual reduction in EU TACs and quotas in response to ICES advice, which in recent years has been for a zero

TAC. However, deep-water sharks continue to be taken as a by-catch in a mixed deep-water trawl fishery in Vb, VI and VII and in a long-line fishery in Sub-area IX.

SOURCE OF MANAGEMENT ADVICE: The main advisory body is ICES. No analytical assessment was carried out in 2008. The assessment is based on commercial CPUE trends and survey trends. Landings data on these species remain very problematical and, in many cases, reliable data are only available for combined siki sharks. Many countries continue to report landings in amalgamated categories such as various sharks N.E.I. Retrospective splitting of the data into species categories and reconstruction of historic data from mixed categories is based on limited information and is problematic.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this species. In common with other deep-water species, U_{lim} has previously been proposed at $0.2 \times$ virgin biomass and U_{pa} at $0.5 \times$ virgin biomass (ICES, 1998) but in the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be estimated.

STOCK STATUS: There is insufficient information to separate the landings of Portuguese dogfish *Centrosymnus coelolepis* and leafscale gulper shark *Centrophorus squamosus*. Total international landings of the combined species have steadily increased to around 11 000 t in 2003 and have rapidly declined after 2003 to the lowest levels since the fishery started. Substantial declines in cpue series for the two species in Subareas V, VI, and VII suggest that both species are severely depleted and that they have been exploited at unsustainable levels. In Division IXa, lpue series are stable for leafscale gulper shark and declining for Portuguese dogfish.

RECENT MANAGEMENT ADVICE: Due to its very low productivity, Portuguese dogfish and leafscale gulper shark can only sustain very low rates of exploitation. The rates of exploitation and stock sizes of deepwater sharks cannot be quantified. However, based on the cpue information, Portuguese dogfish and leafscale gulper shark are considered to be depleted. Given their very poor state, ICES recommends a zero catch of Portuguese dogfish and leafscale gulper shark.

STECF COMMENTS: STECF agrees with the ICES advice for Portuguese dogfish and leafscale gulper shark.

STECF also **recommends** that EU fisheries exploiting deepwater sharks should not proceed until sustainable exploitation rates for deepwater sharks have been determined.

STECF further advises that in order to maximise protection of deep-water sharks, the gill netting ban introduced in 2006 (EC council regulation 51/2006 Annex III) in waters deeper than 600m should be maintained. STECF supports the proposal to extend the gill net ban to other areas (Council regulation (EC) 40/2008, Annex III)

8.14. Kitefin shark (*Dalatias licha*) in the north-east Atlantic

FISHERIES Kitefin shark are caught in the deep-water fisheries in ICES Sub-areas VIII, IX and X and the Mediterranean but the main fishing is in Sub-area X (Azores). In this sub-area X (Azores) this species is a by-catch in demersal deepwater fisheries. At present, there are no directed fisheries for this species. There is the risk that sporadic small-scale target fisheries may develop in the Azores, as a function of the markets. Excluding ICES Subarea X (Azores) where species-specific landings are available, landings of this species are incomplete and have mostly been reported with other species as Squalidae.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on kitefin shark in the Northeast Atlantic is ICES. No assessment was carried out in 2008.

PRECAUTIONARY REFERENCE POINTS No reference points have been defined for this species. In common with other deep-water species, U_{lim} has previously been proposed at $0.2 \times$ virgin biomass and U_{pa} at $0.5 \times$ virgin biomass (ICES, 1998) but in the absence of abundance indices that correspond to the start of the fishery, the reference points cannot be estimated.

STOCK STATUS: No new information available.

RECENT MANAGEMENT ADVICE: The new information available for kitefin shark (*Dalatias licha*) in the North Atlantic is too sparse to revise the advice from 2006. The advice for 2009 and 2010 is therefore the same as the advice given in 2006: "This stock is managed as part of the deep-sea shark fisheries. No targeted fisheries should be permitted unless there are reliable estimates of current exploitation rates and sufficient data to assess productivity."

STECF COMMENTS: STECF agrees with the ICES advice for kitefin shark.

STECF also **recommends** that EU fisheries exploiting deepwater sharks should not proceed until sustainable exploitation rates for deepwater sharks have been determined.

STECF further advises that in order to maximise protection of deep-water sharks, the gill netting ban introduced in 2006 (EC council regulation 51/2006 Annex III) in waters deeper than 600m should be maintained. STECF supports the proposal to extend the gill net ban to other areas (Council regulation (EC) 40/2008, Annex III)

9. Icelandic and East Greenland resources

9.1. Cod (*Gadus morhua*) in ICES Subarea XIV and NAFO Subarea 1 (Greenland cod)

FISHERIES: Commercial fisheries for Greenland cod started along the Greenland West coast in the 1910's (inshore) and 1920's (offshore). The fishery gradually developed culminating with catch levels above 400,000 tons annually in the 1960s. The East Greenland offshore cod fishery started in the 1950's. Due to overfishing and deteriorating environmental conditions, the stock size declined and the fishery completely collapsed in the early 1990's. The 1990s stock collapse was followed by a decade of very limited fishing, with inshore catches falling below 1000 t annually and with no directed offshore fisheries taking place. From 2000, the inshore catches have gradually increased from less than 1000 t to 12,000 t in 2007. From 2002, limited offshore quotas have been allocated to Faeroese and Norwegian vessels, and in 2005-2006, Greenland trawlers were allowed limited quotas for experimental cod fishery. In 2007, small quotas were given to Greenland, the EU (Germany and UK), Norway and the Faeroe Islands with catches reaching 5000 tons, mainly taken off East Greenland.

In 2008, the catches from the coastal fleet amounted to 12,270 including 6 tons taken in East Greenland. The coastal fleet's catches peaks during summer where the dominant pound net fishery takes place. Catches in Div. 1F includes catches from the offshore area taken by coastal vessels. In 2008, the offshore area north of 63°N was closed for directed cod fisheries and the 2008 offshore catches were therefore exclusively off south Greenland (71% in NAFO 1F; 26% in ICES XIVb). The longliners caught 1,339 tons, the trawlers caught 11,582 tons. The EU, Norway and Faeroe Islands took their quotas. Of the Greenland quotas of 11,500 tons, only 8,370 tons were taken.

SOURCE OF MANAGEMENT ADVICE: Analytical assessment is available up to 1992. After the stock depletion in 1992, the trends of the stock have been based on two research survey indices. Cod in Greenland derives from three stock components, labelled by their spawning areas: I) an offshore Greenland spawning stock, II) inshore West Greenland fiords spawning populations, and III) Icelandic spawned cod that drift to Greenland with the Irminger Current. It is not feasible to sample and assess stock status of the various stock components separately, and they are therefore assessed together.

PRECAUTIONARY REFERENCE POINTS: No reference points have been proposed by ICES for this stock.

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be fully evaluated. The offshore component has been severely depleted since 1990. Surveys indicate that the stock is increasing, but it is still far below historical levels. Some of the increase may be due to inflow of recruits (2003 year-class) from Iceland. Dense concentrations of large spawning cod have been found off East Greenland, indicating that a Greenland offshore spawning stock is being established. Stock size and exploitation rate of the inshore component are unknown.

MANAGEMENT AGREEMENTS: Greenland and EC established an agreement on offshore fisheries valid from 2007 to 2012. A variable TAC regulation has been agreed, with annual TACs adjusted to take account of ICES information on stock trends but aiming at fishing mortalities at 0.1. The agreement also provides for a transfer of unutilized quota into future years, should a rapid increase in the stock occur.

RECENT MANAGEMENT ADVICE:

ICES recommends that no fishery should take place in 2010 to allow for rebuilding of the spawning stock. ICES recommends the development of a multi-annual management plan which ensures sustainable stock development.

Other considerations

Exploitation boundaries in relation to existing management plans: As the management agreement has not been evaluated, ICES does not advise according to this agreement.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that there are some outstanding issues with the derivation of the survey indices and understands that ICES will take the necessary steps to solve these issues in a designated survey workshop.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Greenland cod can be classified under Category 10.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 10	≤15,000 t	Advice for zero catch, ≥25% reduction in TAC

9.2. Cod (*Gadus morhua*) in ICES Subarea XII

STECF does not have access to any information on cod in ICES Subarea XII

9.3. Cod (*Gadus morhua*) in Division Va (Icelandic cod)

FISHERIES: Icelandic cod is primarily caught by bottom otter trawlers. Historically, the landings of bottom trawlers constituted a larger portion of the total catches than today, in some years prior to 1990 reaching 60% of the total landings. In the 1990's, the landings from bottom trawlers declined significantly and have been just above 40% of the total landings in the last decade. The share of long-lining has tripled over the last 20 years and is now on par with bottom trawling. The share of gill netting has over the same time period declined and is now only half of what it was in the 1980's. Since the size of cod caught by the gillnet fleet is generally much larger than caught by other fleets, this change in fishing pattern is likely to have caused a significant reduction in the fishing mortality of older fish.

Landings of Icelandic cod in 2008 are estimated to have been 147,000 t, which are the lowest post-war landings. Of the total landings, 144,000 t were taken by the Icelandic fleet but 3,000 t by other nations. The latter includes 1,800 t of cod taken by the Faroese bottom trawl fleet inside the Faroese EEZ close to the line separating the Icelandic and Faroese EEZ. The trend in landings in recent years is largely a reflection of the TAC that is set for the fishing year (starting 1 Sep and ending 31 Aug).

Estimates of annual cod discards since 2001 are in the range of 0.4-1.8% of weight landed. Mean annual discard of cod over the period 2001-2008 was around 2,000 t, or just over 1% of landings. In 2008, estimates of cod discards amounted 0.8% of the landings. The method used for deriving these estimates assumes that discarding only occurs as high-grading. In recent years, misreporting has not been regarded as a major problem in the fishery of this stock. No study is though available to support that general perspective.

SOURCE OF MANAGEMENT ADVICE: The data used in the assessment are landings-at-age and age-structured survey indices. The analytical assessment is based on landings and survey data using the ADCAM (a statistical Catch-at-age Model using AD model builder) programme. Additional assessments using five different models gave consistent results. Landings-at-age data as well as survey indices are considered reliable. The modelling setup is the same as last year.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be evaluated. Since 1990, SSB is slightly increasing but is considerably lower than prior to the mid-1960s. The year-classes from 2001 to 2007 are all below the long-term average. The first estimate of the 2008 year-class indicates that it may

be above average. That year-class will not contribute to the fisheries until 2012. The low recruitment in addition to a historical low weight-at-age means that the productivity of the stock at present is very low. Fishing mortality has declined significantly and is presently lowest observed in 40 years.

MANAGEMENT AGREEMENTS: TACs for Icelandic cod stock have since 1994 been based on a harvest control rule that has been modified three times. The management objective, set in spring 2009, is that there is high probability (>95%) that spawning stock biomass will be above the present size (220,000 t in 2009) by 2015. A harvest control rule, to achieve those objectives has been set in place:

$TAC_{y/y+1} = (0.2 B_{4+,y} + TAC_{y-1/y}) / 2$, where y refers to the assessment year and B refers the biomass of cod 4 year and older.

The TAC for the fishing year 2008/2009 was set at 160,000 t and the TAC for the fishing year 2009/2010 is estimated to be around 150,000 t. Based on these numbers, the landings for the 2009 calendar year are estimated to be around 160,000 t.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of high long-term yield ($F_{MAX} = 0.32$) and landings for the fishing year 2009/2010 of 135,000 t.

Other considerations:

Exploitation boundaries in relation to existing management plans: Following the agreed management plan implies landings of 150,000 t in the fishing year 2009/2010. This management plan is in the process of being evaluated by ICES.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential, and considering ecosystem effect: The current fishing mortality (0.41) is above the fishing mortality that would lead to high long-term yield ($F_{MAX}=0.32$). This indicates that the long-term yield will increase at fishing mortalities well below historical values. Landings corresponding to F_{MAX} are 135,000 t.

STECF COMMENTS: STECF notes that the ICES advice for a catch in 2010 of 135,000 t is based on a fishing mortality rate equivalent to F_{MAX} . STECF considers that F_{MAX} should be regarded as an upper limit on F and therefore advises a catch for 2010 less than 135,000 t.

STECF notes that cod and haddock are often caught in the same fishing operation. The TAC constraint on cod is expected to result in a significant reduction in fishing mortalities. Recent reduction of fishing mortality for cod is not in line with development of fishing mortality for haddock. Anecdotal information from the fisheries indicates that the restrictions on the landings of cod are presently changing the behaviour of the fishing fleet, with fishers trying to avoid catching cod but targeting haddock. Setting a TAC for haddock higher than the advice will likely result in an increase in discarding and misreporting of cod.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Icelandic cod can be classified under Category 6.

Accordingly STECF notes that the rules for the above categories imply the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	≤136,000 t	STECF advice on catch level: 15% constraint on TAC

9.4. Haddock (*Melanogrammus aeglefinus*) in Division Va (Icelandic haddock)

FISHERIES: Icelandic haddock is caught around Iceland with bottom otter trawls, Danish seine and longline. The share of different gears in the haddock catches have been varying with time, with the share of longlines and Danish seine increasing in recent years while the proportion of haddock caught in gillnets is now very small.

Landings in 2008 are estimated to have been 102,500 t, whereof 101,650 t are taken by Iceland and 840 t by other nations (Faroes and Norway). Landings in 2007 were 108,000 tonnes, being the highest for over 40 years.

SOURCE OF MANAGEMENT ADVICE: The assessment is based on age-disaggregated landings from 1979 to 2008 and on survey data from the March survey 1985-2009 and the October survey 1995-2008. An Adapt-type model is being used, not taking into account discards. Commercial cpue from the most important fleets targeting haddock are available for 17 years or more, but are not used in the analytical assessment.

PRECAUTIONARY REFERENCE POINTS: B_{lim} , F_{lim} and B_{pa} have not been defined for this stock. $F_{pa}=0.47$ ($F_{pa}=F_{med}$) was defined by ICES in 2000, but taking into account the strong reductions in mean weight-at-age, the F_{pa} as defined in 2000 corresponds to a fishing mortality of 0.35 under the current conditions.

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be evaluated. Based on the most recent estimate of fishing mortality (in 2008), ICES classifies the stock as at risk of being harvested unsustainably. SSB increased from 2001 to 2005 due to several strong year-classes. Since then, the spawning stock has decreased. Recruitment was high for the year-classes 1998-2003, with five strong year-classes and the 2003 year-class very strong. Recruitment has been around the long-term average since year-class 2004. In recent years, growth was reduced considerably and at the beginning of 2009, the mean weight of most age groups was near a historic low as it has been for the last 3 years. The large 2003 year-class grows especially slowly.

MANAGEMENT AGREEMENTS: For this stock, a TAC is being set by Iceland supplemented with technical measures such as area closures for protecting juveniles and minimum mesh size regulations. The regulatory system includes provision for real-time closures of areas where juveniles are a high proportion of the catch. The effects of these measures have not been evaluated. Trawl grids are mandatory in certain areas.

RECENT MANAGEMENT ADVICE:

The reduction of the mean weight-at-age has caused large changes in the selection pattern in the fishery. Under these circumstances the precautionary fishing mortality ($F_{pa} = 0.47$) corresponds to a fishing mortality of 0.35 because the fish are caught at a smaller size. ICES recommends restricting the fishing mortality to 0.35 in 2010, corresponding to landings of less than 57 000 t.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that haddock and cod are often caught in the same fishing operation. The TAC constraint on cod is expected to result in a significant reduction in fishing mortalities. Recent reduction of fishing mortality for cod is not in line with development of fishing mortality for haddock. Anecdotal information from the fisheries indicates that the restrictions on the landings of cod are presently changing the behaviour of the fishing fleet, with fishers trying to avoid catching cod but targeting haddock. Setting a TAC for haddock higher than the advice will likely result in an increase in discarding and misreporting of cod.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Icelandic haddock can be classified under Category 6.

Accordingly STECF notes that the rules for the above categories imply the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	79,050 t	STECF advice for catch level: 15% TAC constraint

9.5. Saithe (*Pollachius virens*) in Division Va (Icelandic saithe)

FISHERIES: Icelandic saithe are caught around Iceland in directed saithe fisheries as well as in mixed demersal fisheries which target cod, mainly with bottom otter trawls and at a smaller proportion with gill nets and by jigging. Landings of saithe in Icelandic waters have peaked at 102,000 t in 1991, decreased to 31,000 t in 1998 and increased again to around 70,000 t in recent years. In 2008, landings are estimated to have been 70,189 tonnes, predominantly taken by Iceland. Faroese catches were 196 t.

SOURCE OF MANAGEMENT ADVICE: The analytical assessment is based on age-disaggregated landings from 1974 to 2008 and spring survey indices 1985-2009. Information of incoming recruits is limited. An autumn survey and commercial cpue (available for 15 years or more) provide independent support to the assessment, although they are not included in the analysis. Migration of saithe into Icelandic waters is relevant in some years and is estimated in the assessment. The assessment is relatively uncertain due to lack of representative survey data for a species that is partly pelagic, schooling, and relatively widely migrating. The lack of good survey information on incoming recruitment adds to uncertainty in the forecast.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.30$, $F_{lim} = \text{Not defined}$, $B_{pa} = 150,000\text{t}$ and $B_{lim} = 90,000\text{ t}$ respectively.

Note: Taking into account the strong reductions in mean weight-at-age and change in fishing pattern, the F_{pa} as defined in 1998 now corresponds to a lower fishing mortality than 0.3. Under the current conditions, F_{pa} corresponds to a value of 0.22. B_{pa} has been calculated based on of inappropriate historic weight-at-age. Therefore it cannot be used as basis for advice.

STOCK STATUS: Based on the most recent estimate of fishing mortality (in 2008), ICES classifies the stock as at risk of being harvested unsustainably. There has been a change in the selection patterns in recent years, resulting in increasing fishing mortality on younger, small fish. SSB has been declining since 2002 and is at present around the long-term average. Recruitment in recent years has been around the long-term average. The weights-at-age are currently at low values.

MANAGEMENT AGREEMENTS: The fishery is regulated by TACs and minimum mesh size in fishing gears. The national Icelandic advice of 50,000 t in the current fishing year differed from the ICES advice (22,000 t) for 2009 where the latter based the advice on maintaining SSB above B_{pa} in the year following the advisory year. ICES, however, noted that “recent information on stock dynamics and growth rate of saithe suggests that the biomass reference points defined in 1998 would need to be re-evaluated. Fishing at F_{pa} , and thereby ignoring the B_{pa} threshold, would correspond to landings of 50,000 t which is expected to decrease SSB to 124,000 t (10% decrease in SSB compared to 2009).” The TAC for the current fishing year was, however, set by the managers to 65,000 t.

RECENT MANAGEMENT ADVICE:

The reduction of the mean weight-at-age has caused large changes in the selection pattern in the fishery. Under these circumstances, the precautionary fishing mortality ($F_{pa}=0.30$) corresponds to a fishing mortality of 0.22, as the fish are caught at a smaller size. ICES recommends restricting the fishing mortality to 0.22 in 2010, corresponding to landings of less than 34,000 t.

Other considerations:

Low recruitment and low weights-at-age in recent years will result in a low productivity of the stock. There is also a shift in the selection pattern, resulting in an increase in fishing mortality on younger fish. Medium-term simulations indicate that under the current growth and selection conditions, there is a high probability that the stock will decline below the currently defined B_{lim} if fished at $F_{pa}=0.3$. Fishing at $0.73 \times F_{pa}=0.22$ indicate that there is very low probability that the spawning stock will be below B_{lim} under the present growth and selection condition.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Icelandic saithe can be classified under Category 3.

Accordingly STECF notes that the rules for the above categories imply the following option for TACs in 2010.

Category 3 Stock outside safe biological limits.

2010 TAC Basis

Category 3	52,000 t	Aim to set the TAC to the forecast catch that will result in a 30% reduction in fishing mortality rate, but do not reduce the TAC by more than 20% as long as fishing mortality will not increase. Limiting landings in 2010 52,000 t.
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9.6. Greenland halibut (*Reinhardtius hippoglossoides*) in Sub-areas V, VII, XII and XIV

FISHERIES: Most of the fishery for Greenland halibut in Divisions Va, Vb and XIVb is a directed fishery. During the period 1982–1986, landings were stable at about 31,000–34,000 t. In the years 1987–1989, landings increased to about 62,000 t. This was followed by a decline to around 20,000 t in 1999. In the recent period 2000 to 2008, landings were in the range 21,000 to 31,000 t. Landings within Icelandic EEZ have traditionally been reported as caught in Division Va. Therefore, when referring to Division Va (or Icelandic waters), the area covers both Va and the Icelandic EEZ part of XIVb. A smaller part of the landings and fishery relates to the Greenland EEZ part of XIVb as well as international waters on the Reykjanes Ridge. Catches in Icelandic waters have, due to quota regulations, decreased from 37,000 t in 1990 to 11,000 t in 1999. Landings have increased to above 20,000 t in 2003 and were around 11,000 t in recent years.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The data are insufficient for an analytical assessment. A probabilistic (Bayesian) version of a surplus-production model was used to assess the stock. Biomass is expressed on a scale relative to B_{MSY} and F relative to F_{MSY} . The assessment uses biomass indices from a standardized cpue series of the Icelandic trawl fleet (1985–2008) and two trawl surveys (Va: 1996–2008, XIV: 1998–2008).

PRECAUTIONARY REFERENCE POINTS: Presently, there are no defined reference points.

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be fully evaluated. The assessment is considered indicative of stock trends, and provides relative measures of stock status. The stock has been below B_{MSY} since the mid-1990s and is presently at a historical low of 40% of B_{MSY} . Present fishing mortality is estimated at twice the fishing mortality that is associated with maximum sustainable yield.

MANAGEMENT AGREEMENTS: There is no regional management agreement in place. ICES recommends that an adaptive management plan is developed and implemented, covering the whole stock area.

RECENT MANAGEMENT ADVICE:

Given the continued poor state of the stock, there is a need to reduce the exploitation of the stock considerably. Therefore, the present high fishing mortality must be reduced to well below F_{MSY} , in order to increase the probability of a more rapid stock recovery. ICES recommend restricting catches to no more than 5,000 tonnes in 2010 to ensure that fishing mortality is kept well below F_{MSY} . This reduction in catches could be part of an adaptive management plan that covers the whole stock area.

Other considerations:

ICES has previously advised on catches of no more than 15,000 t as an initial step in an adaptive management plan. The medium-term forecasts now available suggest that catches of 15,000 t could lead to a further decline in the stock. Stock recovery is slow under all fishing scenarios for a slow-growing and long-lived species as Greenland halibut, even in the case of no fishery. Therefore ICES recommends a reduction of the present high fishing mortality (two times F_{MSY}) to well below F_{MSY} , in order to increase the probability of a more rapid stock recovery. Catch reductions no more than 5 kt are required to ensure that fishing mortality is kept well below F_{MSY} . The management plan should include monitoring of the effort and stock development as well as a framework for adapting future fishing according to the response of the stock. Since Greenland halibut is a highly vulnerable species, it is expected that a change in stock dynamics may take several years and this should be taken into consideration in the adaptive management plan. Distribution of total fishing effort for Greenland halibut indicates that the fishery in 2008 is concentrated in a much smaller area compared to the overall fishery in the period 1991–2008 for the species.

Available biological information such as tagging and genetic studies and information on distribution of the fisheries suggest that Greenland halibut in Divisions XIV and V belong to the same stock entity.

Because the nursery grounds are not known and recruits and juveniles are therefore not monitored, and because

Greenland halibut is a slow-growing species that first appears in the catches at age 4-6, a possible recruitment failure will only be detected in the fishery some 5–10 years after it occurs.

STECF COMMENTS: STECF agrees with the ICES advice and supports its conditions highlighted in its proposals for an adaptive joint management plan.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Greenland halibut in Sub-areas V, VII, XII and XIV can be classified under Category 6.

Accordingly STECF notes that the rules for the above categories imply the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	21,250 t	STECF advice on catch level, Annex III Rule 1, 15% reduction TAC

9.7. Redfish (*Sebastes marinus*) in Sub-areas V, VI, XII and XIV

FISHERIES: *S. marinus* are mainly taken by bottom otter trawlers in depths down to 500 m. Icelandic trawlers account for the majority of the catches from Division Va, while Faroese trawlers take most of the catches from Division Vb. In Sub-area XIV, the catches are mainly a by-catch in shrimp fisheries. In order to reduce the catches of *S. marinus* in Division Va, an area closure was imposed in 1994 and the quotas have been reduced in recent years.

The total catch of *S. marinus* in Divisions Va and Vb and in the Sub-areas VI and XIV has decreased from about 130,000 t in 1982 to about 40,000 t during the mid-1990s. Since then, the annual catches varied without a clear trend between 40,000 - 50,000 t. In recent years, around 98% of total catches were taken in Division Va.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The state of the stock is classified according to results of the Icelandic spring groundfish survey (1985-2009). The quantitative advice is derived from analysis with an age-length-based model (GADGET). Data from the commercial catch in Division Va include length distribution, age length key, and mean length-at-age. Survey data available from Divisions Vb (1994-2009) and XIV (1985-2008) are not used in the forecast. There are no explicit management objectives for this stock.

PRECAUTIONARY REFERENCE POINTS: ICES suggest that the relative state of the stock be assessed through survey index series (U) in Icelandic waters, which imply a maximum, U_{MAX} , as well as the present state. Given these data, ICES has proposed that U_{pa} be set at 60% of U_{MAX} , the highest observed survey index.

STOCK STATUS: Based on the most recent indicator of SSB (in 2008), ICES classifies the stock as being at risk of having reduced reproductive capacity. In recent years, the survey index in Icelandic waters has fluctuated around U_{pa} and at present, is slightly below. Survey indices of both pre-fishery recruits and of fishable size in East Greenland have increased in recent years.

In Division Vb, the Faroese groundfish survey (covering 1994–2009) indicates that the abundance has been stable at a low level since 2001. Landings have declined since 1985 to a low level in recent years, and this decline is also reflected in the Faroese summer survey.

MANAGEMENT AGREEMENTS: The present management scheme in Division Va sets a joint TAC for *S. marinus* and demersal *S. mentella* on the shelf. This impedes direct management of fisheries on *S. marinus*. TAC or effort allocated to demersal redfish fishery should be given separately for each of the redfish species. Subarea XIV is an important nursery area for redfish. Measures to protect juvenile redfish in Subarea XIV are in place (sorting grids in the shrimp fishery). No formal agreement on the management of *S. marinus* exists among the three coastal states, Greenland, Iceland and the Faroe Islands. In Greenland and Iceland, the fishery is regulated by a TAC and in the Faroe Islands by effort limitation.

RECENT MANAGEMENT ADVICE:

Catches in 2010 should be less than 30,000 t, because this is expected to keep the stock above U_{pa} in the medium term.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that the Ministry of Fisheries in Iceland established a committee with the objective to review and recommend on how to separate quotas for the

two redfish species and understands that consensus was reached that quota for those two species should be given separately and that this scheme is expected to be implemented in the next fishing year which starts 1 September 2009.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that redfish (*Sebastes marinus*) in Sub-areas V, VI, XII and XIV can be classified under Category 6.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	NE*	STECF advice on catch level, Annex III rule 4, Unchanged TAC

*NE = not estimable – no separate TAC for *S. marinus*

9.8. Redfish (*Sebastes mentella*) on the continental shelf of Iceland (demersal in Division Va and Sub-area XIV)

The stock structure of redfish *S. mentella* in Subareas V, VI, XII and XIV, and in the NAFO Convention Area has been evaluated by ICES early 2009. The outcome is that demersal *S. mentella* in Icelandic waters (in ICES Divisions Va and XIV) is to be treated as one biological stock, separated from the demersal *S. mentella* found on the continental slopes of Greenland (Division XIV) and the Faroe Islands (Vb).

FISHERIES: In Division Va, demersal *S. mentella* are taken mainly by Icelandic trawlers at depths greater than 500 m. The total annual catches almost doubled in the early 1990s, but have since then decreased to the level of the 1980s. The increase was mainly caused by an increased catch in Division Va. The increased catch of *S. marinus* in Va in 2002 and decreased catch of *S. mentella* in 2001 and 2002 is due to a joint quota for *S. marinus* and *S. mentella* on the shelf, and the fishing fleet has increased the proportion taken from *S. marinus* in most recent years. Since 2004, total annual catches varied between 18,000 and 25,000 t. Landings in 2007 are estimated to be the lowest since that time at 17,600 t. The catch figures of demersal *S. mentella* do include catches taken by pelagic gears close to the bottom and east of a management line in the Icelandic EEZ, which by definition separates Icelandic demersal from pelagic catches of *S. mentella*.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Survey data are used from the Icelandic groundfish survey in Va (2000-2008). Cpue data was used from Icelandic trawlers in Division Va (1986-2008). There are no explicit management objectives for this stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are established.

STOCK STATUS: In the absence of reference points, the state of the stock cannot be fully evaluated. Commercial cpue indicates a general decrease in stock biomass from the late 1980s to the early 1990s; since then it has been relatively stable. Available survey biomass estimates indicate that in Division Va, the biomass has been low but stable in recent years.

MANAGEMENT AGREEMENTS: The present management scheme in Division Va sets a joint TAC for *S. marinus* and demersal *S. mentella* on the shelf. This impedes direct management of fisheries on *S. marinus*. TAC or effort allocated to demersal redfish fishery should be given separately for each of the redfish species. No formal agreement on the management of demersal *S. mentella* exists among the three coastal states, Greenland, Iceland and the Faroe Islands. In Greenland and Iceland, the fishery is regulated by a TAC and in the Faroe Islands by effort limitation.

RECENT MANAGEMENT ADVICE: ICES advises that a management plan be developed and implemented which takes into account the uncertainties in science and the properties of the fisheries. ICES suggests that catches of *S. mentella* are set no higher than 10,000 t as a starting point for the adaptive part of the management plan.

Other considerations:

ICES suggests that catches of *S. mentella* are set at 10,000 t as a starting point for the adaptive part of the management plan. ICES has previously advised that most deep-water species like redfish can only sustain low rates of exploitation, since slow-growing, long-lived species that are depleted have a long recovery period. Fisheries should only be allowed to expand when indicators have been identified and a management strategy including appropriate monitoring requirements has been decided and is implemented.

A catch of 10,000 t would be a significant reduction in catches compared with the recent past. This is expected to result in a lower exploitation rate, but the absolute magnitude cannot be estimated. Subarea XIV in Greenland waters is believed to be an important nursery area for *S. mentella* found in Icelandic waters. Measures to protect juvenile redfish in Subarea XIV should be continued (sorting grids in the shrimp fishery).

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that the Ministry of Fisheries in Iceland established a committee with the objective to review and recommend on how to separate quotas for the two redfish species and understands that consensus was reached that quota for those two species should be given separately and that this scheme is expected to be implemented in the next fishing year which starts 1 September 2009. STECF further notes that no advice from ICES is available on demersal redfish (*S. mentella*) in areas Vb and XIV, which are now being assessed separately from *S. mentella* on the continental shelf of Iceland.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that redfish (*Sebastes mentella*) on the continental shelf of Iceland can be classified under Category 6.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	NE*	STECF advice on catch level, Annex III, rule 4, unchanged TAC

*NE = not estimable –no separate TAC for *S. mentella*

9.9. Pelagic redfish (*Sebastes mentella*) in ICES areas Va, XII and XIV and NAFO Sub-areas 1-2

The stock summary and advice for pelagic redfish (*Sebastes mentella*) in ICES areas Va, XII and XIV and NAFO Sub-areas 1-2 will be updated in October 2009 and included in the consolidated STECF review of advice for 2010 for Stocks of Community interest. In view of this, STECF has not attempted to categorise pelagic redfish in ICES areas Va, XII and XIV and NAFO Sub-areas 1-2 according to the Communication on Fishing opportunities for 2010 (COM (2009) 224).

9.10. Icelandic summer-spawning herring (*Clupea harengus*, Division Va)

FISHERIES: Icelandic summer-spawning herring are caught with purse seines and mid-water trawls. The catches increased rapidly in the early 1960s due to the development of the purse-seine fishery off the southern coast of Iceland. This resulted in a rapidly increasing exploitation rate until the stock collapsed in the late 1960s. A fishing ban was enforced during 1972-1975. The catches have since increased gradually to over 100,000 t. Formerly, the fleet consisted of multi-purpose vessels, mostly under 300 GRT, operating purse-seines and driftnets. In recent years, larger vessels (up to 1500 GRT) have entered the fishery. These are a combination of purse-seiners and pelagic trawlers operating in the herring, capelin, and blue whiting fisheries. Since the 1997/1998 fishing season, there has been a fishery for herring both to the west and east of Iceland, which is unusual compared to earlier years when the fishable stock was only found south and east of Iceland. Pelagic trawl fisheries were introduced in 1997/98 and have since then contributed with approximately 20-60% of the catches, but with much less contribution in recent two years (<5%). By-catch in the herring fishery is normally insignificant as the fishing season is during the over-wintering period when the herring is in large dense schools. Until the autumn 1990, the herring fishery took place during the last three months of the calendar year. During 1990-2008, the autumn fishery continued until January or early February of the following year, and has started in September/October since 1994. In 2003, the season was further extended to the end of April, and in the summers of 2002 and 2003, an experimental fishery for spawning herring with a catch of about 5,000 t each

year was conducted at the south coast. The number of vessels participating in the fishery has shown a decreasing trend in the 2000s from around 30 down to 20 in 2007.

SOURCE OF MANAGEMENT ADVICE: The data used in the assessment are catch-at-age (from 1990 onwards) and one age-structured acoustic survey index, based on a survey conducted since 1974 in October-December and/or January. In addition to the acoustic survey aimed at the fishable part of the stock, there have been occasionally acoustic surveys off the NW, N, and NE coast of Iceland aimed to estimate the year-class strength of the juveniles. This survey has not taken place since 2003, but was partly resurrected in January 2009. The results of these measurements were normally not used in the assessment directly even if the year-class indices derived from the survey have shown a significant relationship to recruitment of the stock.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for fishing mortality and biomass are $F_{pa} = 0.22$, $F_{lim} = \text{Not defined}$, $B_{pa} = 300,000\text{t}$ and $B_{lim} = 200,000\text{ t}$ respectively.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009), ICES classifies the stock as having full reproductive capacity. Based on the most recent estimate of fishing mortality (in 2008), ICES classifies the stock as being at increased risk of being harvested unsustainably. Recruitment in the last decade has been at or above the long-term average, with occurrence of strong year-classes in 1999, 2000 and 2002. A high *Ichthyophonus* infection was observed in the stock in the winter 2008/2009 causing an additional natural mortality.

MANAGEMENT AGREEMENTS: The practice has been to manage fisheries on this stock at $F = F_{0.1}$ ($= 0.22 = F_{pa}$) for more than 20 years. However, no formal management strategy has been adopted. The Icelandic TACs for herring apply from 1 September to 1 May the following year. The catch is normally taken from September to February.

RECENT MANAGEMENT ADVICE:

Fishing at $F_{pa}=0.22$ in 2009/2010 implies catches of 75,000 t, assuming 32% mortality due to *Ichthyophonus* infection in beginning of 2009 and no further *Ichthyophonus* mortality in remaining 2009. Because of the *Ichthyophonus* infection a forecast is not provided. In July 2009, new information on *Ichthyophonus* infection will be available from survey monitoring, and ICES recommends that no TAC be set until this information is available.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Icelandic summer-spawning herring can be classified under Category 3.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

2010 TAC	Basis
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Category 3	NE* Outside safe biological limits: reduce F by 30%, 20% TAC constraint
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*NE = not estimable – no catch forecast

9.11. Capelin (*Mallotus villosus*) in Subareas V and XIV and Division IIa west of 5°W (Iceland-East Greenland-Jan Mayen area)

FISHERIES: The fishery is primarily based on maturing capelin of each year class which spawns at age 3 as well as those fish at age 4, that did not mature and spawn at age 3.

A starting quota for a fishing season is allocated to Iceland, Norway, Faroe Islands and Greenland by an existing agreement between the nations. No direct fishery was allowed in the season 2008/09 as surveys failed to record enough capelin to start the fishery according to the catch rule in effect. Usually the first spawning migration enters the warm Atlantic water off the southeast coast at the beginning of the second week of February. From there they migrate fairly fast westward in near-shore areas. This was the case in February 2009. A scouting quota of

about 15 000 tonnes was caught in the latter half of February- beginning of March and it was all frozen for human consumption and roe processing. This limited fishery took place off South Iceland and in Faxaflói.

In recent years, the fishery for capelin has changed from being mostly an industrial fishery to being mostly for human consumption. This is largely because of the low abundance and low TACs.

Landings peaked in 1996-97 at 1.57 million t, and have since declined relatively steadily.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The basis for stock assessment and short-term forecasts are acoustic surveys and catch-at-age information.

MANAGEMENT OBJECTIVES: The fishery is managed according to a two-step management plan which requires a minimum spawning-stock biomass of 400 000 t by the end of the fishing season. The first step in this plan is to set a preliminary TAC based on the results of an acoustic survey carried out to evaluate the immature (age 1 and most of age 2) part of the capelin stock about a year before it enters the fishable stock. The initial quota is set at 2/3 of the preliminary TAC, calculated on the condition that 400 000 t of the SSB should be left for spawning. The second step is based on the results of another survey conducted during the fishing season for the same year classes. This result is used to revise the TAC, still based on the condition that 400 000 t of the SSB should be left for spawning.

ICES has not evaluated the management plan with respect to its conformity to the precautionary approach.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are defined for this stock.

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be evaluated. It is estimated that 328 000 t were left for spawning in spring 2009 which is below the management target. The 2007 year-class is estimated to be the second lowest in the time-series and not sufficient to start a fishery in 2009.

RECENT MANAGEMENT ADVICE:

Exploitation boundaries in relation to existing management plans: The 2007 year class is estimated to be very low and not sufficient to start a fishery in 2009/10. There should be no fishery until new information on stock size becomes available after the planned survey in November 2009. The TAC should be set so that at least 400 000 t is left to spawn in March 2010.

STECF COMMENTS: STECF agrees with the ICES advice

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that 9.11. Capelin (*Mallotus villosus*) in Subareas V and XIV and Division IIa west of 5°W (Iceland-East Greenland-Jan Mayen area) can be classified under Category 5 Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 5	0 t*	Short-lived species

*unless the real-time monitoring in November 2009 can show at least 400 000 t is left to spawn in March 2010.

10. Resources in the Barents and Norwegian Seas

10.1. Northern Shrimp (*Pandalus borealis*) in Sub-areas I (Barents Sea) and & IIb (Svalbard Waters)

FISHERIES: The fisheries for Northern shrimp in Sub-areas I & II (Barents Sea & Svalbard area) are among the largest shrimp fisheries in the North east Atlantic. Norway and Russia take the majority of the landings. In the early 1980s total landings were above 100,000 t, but have since declined.

Reported landings for all countries increased between 1995 (25,000 t) and 2000 (83,000 t), but have since decreased: 60,000 t in 2002, around 40 000 t in 2003-2005 and around 30 000 t in 2007.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed jointly by Norway and Russia. ICES is providing biological advice for management of this stock.

PRECAUTIONARY REFERENCE POINTS: Following a NAFO recommendation for stocks assessed by stock production models, a limit reference values (B_{lim}) defined as 30% of B_{msy} is used.

STOCK STATUS: Stock biomass was well above B_{msy} and F below F_{msy} at the end of 2007. Since 2006 this stock has been assessed by a Bayesian version of a surplus production model, using a) total catch and b) 2 different sets of indices (Norwegian and Russian) of stock biomass as input. This model provides estimates of biomass relative to B_{msy} . According to this model the biomass has fluctuated above B_{msy} since the late 1980s. Correspondingly F_{msy} has been below F_{msy} . However, the effect of predation by the Barents Sea cod stock has not yet been included in the model.

RECENT MANAGEMENT ADVICE: There are no explicit management objectives for this stock. Based on a catch option table with associated risks of B falling below B_{lim} , ICES recommends that the TAC for 2009 should not exceed 50000 t. According to the model output such catch level would imply a low risk (probability), that the biomass falls below B_{lim} and F being above F_{lim} .

Shrimp is an important prey for several fish species, especially cod, and consumption by cod probably influences shrimp population dynamics significantly and should be taken into account in management. Estimates of cod consumption of shrimp are on average much higher than shrimp landings.

STECF COMMENTS: STECF agrees with the ICES advice

10.2. Cod (*Gadus morhua*) in area I and II (North East Arctic cod)

FISHERIES: Northeast arctic cod is exploited predominantly by Norway and Russia with smaller landings by countries including the UK, the Faroe Islands, Spain and Germany. The fishery for North east Arctic cod is conducted both by an international trawler fleet operating in offshore waters and by vessels using gillnets, long-lines, hand-lines and Danish seine operating both offshore and in the coastal areas.

From a level of about 900,000 t in the mid-1970s, landings declined steadily to around 300,000 t in 1983-1985. Landings increased to above 500,000 t in 1987 before dropping to 212,000 t in 1990, the lowest level recorded in the post-war period. The catches increased rapidly from 1991 onwards, stabilised around 750,000 t in 1994-1997 but decreased to about 414,000 t in 2000. The catches in 2004 and 2005 are estimated to be to 606,000 t and 641,000 t. In 2006, the catch was estimated to 538,000 t, 487,000 t in 2007 and 464,000 t in 2008.

Under-reporting of landings has been an important issue for this stock in recent years. Two sets of estimates of non-reported landings (IUU) for the period 2002–2007 were available, ranging from 41,000–166,000 t and 9,000–41,000 t in recent years. ICES does not have a basis on which to choose one estimate over the other. The series with 41,000–166,000 t unallocated landings was taken forward in the calculations because this is the same method as the one used last year. The choice of the time-series of unreported landings does not affect the advice according to the agreed HCR. The discrepancies between the two methods for estimation of unreported landings must be resolved by the management authorities and made available to ICES.

The TAC for 2009 was set above the catch corresponding to the agreed management plan. The earlier testing of the agreed management plan presumed that the plan should be strictly followed for setting TAC, and the deviation from the management plan in last year is not considered to be a precautionary practice. ICES considers that application of the agreed management plan in 2010 has long-term benefits above the application of F_{pa} .

The estimates of unreported landings have been reduced considerably from 2006 to 2008, which can probably be attributed to the introduction of port state control in the NEAFC area from 1 May 2007. For 2008, the estimate of 15 000 t unreported landings is around 3% of the international reported catch.

Unreported landings will reduce the effect of management measures and will undermine the intended objectives of the harvest control rule. It is therefore important that management agencies ensure that all catches are counted against the TAC.

Quotas were introduced in the trawl fishery in 1978 and for the fisheries with conventional gears in 1989. In addition to quotas, the fisheries are regulated by mesh size limitations (including sorting grids), a minimum catching size, a maximum by-catch of undersized fish, maximum by-catch of non-target species, closure of areas with high densities of juveniles, and by seasonal and area restrictions. Since January 1997 sorting grids have been

mandatory for the trawl fisheries in most of the Barents Sea and Svalbard area. The fisheries are controlled by inspections of the trawler fleet at sea, by a requirement of reporting to catch control points when entering and leaving the EEZs, and by inspections for all fishing vessels when landing the fish. Keeping a detailed fishing logbook on board is mandatory for most vessels, and large parts of the fleet report to the authorities on a daily basis. There is some evidence that the present catch control and reporting systems are not sufficient to prevent under-reporting of catches.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on analysis of catch-at-age data, using one commercial CPUE series and three survey series. Estimates of cannibalism are included in the natural mortality. The total effect of the discarding and IUU fishing is still unclear and requires more work before it can be included in the assessments.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are $B_{pa} = 460,000$ t, $B_{lim} = 220,000$ t $F_{pa} = 0.40$ and $F_{lim} = 0.74$.

MANAGEMENT AGREEMENTS: This stock is currently managed by a joint Norwegian and Russian scientific advisory body. The fisheries are regulated according to bilateral agreements between Russia and Norway.

At the 33rd meeting of the Joint Russian-Norwegian Fisheries Commission (JRNC) in November 2004, the following decision was made:

“The Parties agreed that the management strategies for cod and haddock should take into account the following:

- *conditions for high long-term yield from the stocks*
- *achievement of year-to-year stability in TACs*
 - *full utilization of all available information on stock development*
 -

On this basis, the Parties determined the following decision rules for setting the annual fishing quota (TAC) for Northeast Arctic cod (NEA cod):

- *estimate the average TAC level for the coming 3 years based on F_{pa} . TAC for the next year will be set to this level as a starting value for the 3-year period.*

- *the year after, the TAC calculation for the next 3 years is repeated based on the updated information about the stock development, however the TAC should not be changed by more than $\pm 10\%$ compared with the previous year's TAC.*

- *if the spawning stock falls below B_{pa} , the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from F_{pa} at B_{pa} , to $F = 0$ at SSB equal to zero. At SSB-levels below B_{pa} in any of the operational years (current year, a year before and 3 years of prediction) there should be no limitations on the year-to-year variations in TAC.*

- *The Parties agreed on similar decision rules for haddock, based on F_{pa} and B_{pa} for haddock, and with a fluctuation in TAC from year to year of no more than $\pm 25\%$ (due to larger stock fluctuations).¹”*

The plan aims to maintain F at $F_{pa} = 0.40$ and restrict between-year TAC change to $\pm 10\%$ unless SSB falls below B_{pa} , in which case the target F should be reduced.

Based on evaluations made in 2006 and 2007, ICES considers the management plan to be in accordance with the precautionary approach. If conditions change to outside the assumed range (with respect to biological conditions, assessment quality, or implementation error), the management plan may have to be revised.

STOCK STATUS: Based on the most recent estimates of SSB and fishing mortality, ICES classifies the stock as having full reproductive capacity and being harvested sustainably. The SSB has been above B_{pa} since 2002. Fishing mortality was reduced from well above F_{lim} in 1999 to below F_{pa} in 2007. As predicted last year, surveys indicate that cod recruitment is anticipated to be below the long-term mean both in 2009 and 2010, and also additionally in 2011.

RECENT MANAGEMENT ADVICE:

¹ This quotation is taken from point 5.1, in the Protocol of the 33rd session of The Joint Norwegian-Russian Fishery Commission and translated from Norwegian to English. For an accurate interpretation, please consult the text in the official languages of the Commission (Norwegian and Russian).

ICES advises on the basis of the existing management plan which implies landings of 577,500 t in 2010.

Other considerations

Exploitation boundaries in relation to existing management plans: The agreed management plan implies landings of 577,500 t in 2010 (maximum 10% change in TAC from 2009). This projection includes all landings and therefore the TAC must account for any unreported landings.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: The current fishing mortality is in the range of F_s that are associated with high long-term yield and low risk of depleting the production potential.

Exploitation boundaries in relation to precautionary limits: The agreed management plan has been found to be consistent with the precautionary approach and is therefore the basis for the advice which implies landings of 577,500 t in 2010.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that TACs in this fishery have not been enforced in the past and unless measures are taken to do so, the realised fishing mortality is likely to exceed the one derived from the management plan in 2009. STECF notes that the level of unreported catches has averaged 20% of total catches over the past four years and managers may wish to take this into account when setting the 2009 TAC.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed management plan the TAC for 2010 should be set at 577,500 t.

10.3. Cod (*Gadus morhua*) in area I and II (Norwegian coastal cod)

FISHERIES: In addition to TACs, the fishery is regulated by the same minimum catch size, minimum mesh size on the fishing gears as for the Northeast Arctic cod, maximum by-catch of undersized fish, closure of areas having high densities of juveniles, and by seasonal and area restrictions.

Trawl fishing for cod is not allowed inside the 6-nautical mile line except for about 10 fresh fish trawlers which in a few areas have a dispensation to fish between the 4 and 6-mile line in the period 15. April – 15. September.

Since the mid-1990s the fjords in Finnmark and northern Troms (areas 03 and 04) have been closed for fishing with Danish seine. Since 2000 the large longliners have been restricted to fish outside the 4-nautical mile line. To achieve a reduction in landings of coastal cod additional technical regulations in coastal areas were introduced in May 2004 (after the main fishing season) and continued with small modifications in 2005 and 2006. In the new regulations “fjord-lines” are drawn along the coast to close the fjords for direct cod fishing with vessels larger than 15 meter. A box closed for all fishing gears except hand-line and fishing rod is defined in the Henningsvær–Svolvær area. This is an area where spawning concentrations of coastal cod is usually observed and where the catches of coastal cod has been high. Since the coastal cod is fished under a merged coastal cod/northeast Arctic cod quota, these regulations are aimed at moving parts of the traditional coastal fishery from the catching of coastal cod in the fjords to a cod fishery outside the fjords, where the proportion of northeast Arctic cod is higher. Further restrictions were introduced in 2007 by not allowing pelagic gillnet fishing for cod and by reducing the allowed by-catch of cod when fishing for other species inside fjord lines from 25% to 5%, and outside fjord lines from 25% to 20%. The regulations were maintained in 2008. In addition, in 2009 one more spawning area was closed for fishery (except for hand line and fishing rod) in the spawning season: this is Borgundfjorden near Ålesund, which is the most important spawning area in the southern part of the stock distribution area.

The 2008 landings were estimated to be 26 000 t, i.e. above the 2008 TAC of 21 000 t. The regulations have not been sufficient to cause large reductions in catches, and current catches are still too high.

Norwegian coastal cod is managed as part of the Norwegian Northeast Arctic cod fishery. From the mid-1970s to 2003 an expected yield of 40 000 t from the coastal cod was added annually to the quota for Northeast Arctic cod. In 2004 and later years the additional catch expected from this stock has been set near 20 000 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Surba and XSA analyses are used to give broad trends, and it is based on catch-at-age data and on an acoustic survey. The assessment is considered indicative of stock trends and does not reflect absolute stock sizes. This does not invalidate the overall conclusions.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been established for this stock.

MANAGEMENT AGREEMENTS: There are no stated management objectives for this stock and no known management agreements.

STOCK STATUS: In the absence of defined precautionary reference points the state of the stock cannot be fully evaluated. Survey trends in combination with reported landings indicate that the SSB is close to the lowest observed level. Recruitment declined over the period 1995–2002 and has remained low since. Recruitment is clearly impaired at present SSB. Fishing mortality is unknown, and the harvest rate (proxy for fishing mortality) has increased in 2008 after a decline in recent years.

RECENT MANAGEMENT ADVICE:

Exploitation boundaries in relation to precautionary limits: Given the low SSB and recruitment for this stock, no catch should be taken from this stock in 2010 and a recovery plan should be developed and implemented.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that TACs in this fishery have not been enforced in the past and unless measures are taken to do so, the realised fishing mortality is likely to exceed the one derived from the management plan in 2009. STECF notes that the level of unreported catches has averaged 20% of total catches over the past four years and managers may wish to take this into account when setting the 2009 TAC.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Norwegian coastal cod should be classified as Category 10.

Accordingly STECF notes that the rules for category imply the following TAC for 2010.

	2010 TAC	Basis
Category 10	15,750 t	Advice for zero catch, TAC = 25% reduction.

10.4. Haddock (*Melanogrammus aeglefinus*) in subareas I and II (Northeast Arctic haddock)

FISHERIES: The fishery is mainly a trawl fishery, in some periods only as by-catch in the fishery for cod. Occasionally there is also a directed trawl fishery for haddock. A large portion of the catches is taken as by-catch in a fishery directed at cod. Quotas restrict the fishery. The fishery is also regulated by a minimum catching size, a minimum mesh size in trawls and Danish seine, a maximum by-catch of undersized fish, closure of areas with high density of juveniles, and other area and seasonal restrictions. Since January 1997, sorting grids have been mandatory for the trawl fisheries in most of the Barents Sea and Svalbard area. There are recently no discrepancies between the officially reported landings and the landings used in the assessment. Haddock landings taken in Norwegian coastal areas south of 67°N are not included. In recent years Norway and Russia have accounted for more than 70% of the landings. The total landings in 2007 and 2008 were estimated to be 161,000 t and 156,000 t respectively.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. Analytical assessment based on catch-at-age data, using three survey series. Estimates of cod predation on young haddock are included in the natural mortality. Two series of IUU catch were made available to ICES, but the advice is based on one series only. The surveys in 2006 had incomplete coverage, but the index calculation has been adjusted accordingly (ICES. 2008. Report of the Arctic Fisheries Working Group, 21–29 April 2008. ICES CM 2008/ACOM:01).

REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are $B_{pa} = 80,000$ t, $B_{lim} = 50,000$ t, $F_{pa} = 0.35$ and $F_{lim} = 0.49$.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as having full reproductive capacity and being harvested sustainably. The SSB has been above B_{pa} since 1989. Fishing mortality was reduced from above F_{lim} in 1988 to below F_{pa} in 2000-2002, and has since been around F_{pa} . Recruitment at age 3 has been at or above average since 2000. The year-classes 2004-2006 are estimated to be very strong. Surveys indicate that the year-classes 2007 and 2008 are below average.

MANAGEMENT AGREEMENTS: A management plan has been in force since 2004 with the objectives of maintaining high long-term yield, year-to-year stability, and full utilization of all available information on stock dynamics. The plan aims to maintain F at $F_{pa} = 0.35$ and minimize between-year TAC change to $\pm 25\%$, unless SSB falls below B_{pa} in which case the management targets should change.

At the 36th Session of the Joint Russian–Norwegian Fishery Commission (JRNFC) in autumn 2007 the parties agreed to modify the former three-year rule to a one-year rule in accordance with the results of ICES HCR evaluation.

The agreed HCR for haddock (2007) is as follows (Protocol of the 36th Session of The Joint Norwegian–Russian Fishery Commission, 10 October 2007):

- *TAC for the next year will be set at level corresponding to F_{pa} .*
- *The TAC should not be changed by more than $\pm 25\%$ compared with the previous year TAC.*

If the spawning stock falls below B_{pa} , the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from F_{pa} at B_{pa} to $F = 0$ at SSB equal to zero. At SSB-levels below B_{pa} in any of the operational years (current year and a year ahead) there should be no limitations on the year-to-year variations in TAC.

ICES evaluated the modified management plan and conclude that it is in agreement with the precautionary approach.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the existing management plan which implies catches of 243 000 t in 2010.

Other considerations

Exploitation boundaries in relation to existing management plans: The agreed management plan implies landings of 243 000 t in 2010 (maximum 25% change in TAC from 2009, keeping F below F_{pa}). This projection includes all landings and therefore the TAC must also account for unreported landings

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential, and considering ecosystem effects: The current fishing mortality, estimated at 0.35 is within the range that is expected to lead to high long-term yields and low risk of depleting the productive potential ($F_{0.1} = 0.20 - F_{pa} = 0.35$).

Exploitation boundaries in relation to precautionary considerations: The agreed management plan is considered to be consistent with the precautionary approach.

STECF COMMENTS: STECF agrees with the ICES advice. STECF notes that under-reporting of landings has been an important issue for this stock in recent years, fluctuating between 4% to 34% of the international reported landings. Non-reported landings (IUU) for the period 2002-2008 were estimated ranging from 6 000 t to 40 000 t. This series was taken forward in the calculations and is the same method as was used in previous years. Including or not including the time-series of unreported landings into assessment affects the perception of the stock, but does not affect the advice since the agreed 25% maximum annual change in TAC is in effect this year.

Unreported landings will reduce the effect of management measures and will undermine the intended objectives of the harvest control rule. It is therefore important that management agencies ensure that all catches are counted against the TAC.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed management plan the TAC for 2010 should be set at 243,000 t.

10.5. Saithe (*Pollacius virens*) in the North East Arctic (Sub-areas I and II)

FISHERIES: Since the early 1960s, the fishery has been dominated by purse seine and trawl fisheries, with a traditional gill net fishery for spawning saithe as the third major component. The purse-seine fishery is conducted in coastal areas and fjords. Historically, purse-seiners and trawlers have taken, approximately, equal shares of the catches. Regulation changes led to a reduction in the amounts being taken by purse-seiners after 1990.

Landings of saithe were highest in 1970-1976 with an average of 238,000 t and a maximum of 265,000 t in 1970. This period was followed by a sharp decline to a level of about 160,000 t in the years 1978 - 1984. Another decline followed and from 1985 to 1991, the landings ranged from 70,000 - 122,000 t. An increasing trend was seen after 1990 to 171,498 t in 1996. Since then the annual landings have fluctuated between 136,000 and 212,480 t. with the highest figure in 2006. Landings in 2007 were 197,000 t and 183,000 t in 2008.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed by a joint Norwegian and Russian scientific advisory body. The fisheries are regulated according to bilateral agreements between Russia and Norway.

The Norwegian Ministry of Fisheries and Coastal Affairs implemented a harvest control rule (HCR) in autumn 2007. The harvest control rule contains the following elements:

- *estimate the average TAC level for the coming 3 years based on F_{pa} . TAC for the next year will be set to this level as a starting value for the 3-year period.*
- *the year after, the TAC calculation for the next 3 years is repeated based on the updated information about the stock development, however the TAC should not be changed by more than +/- 15% compared with the previous year's TAC.*
- *if the spawning stock biomass (SSB) in the beginning of the year for which the quota is set (first year of prediction), is below B_{pa} , the procedure for establishing TAC should be based on a fishing mortality that is linearly reduced from F_{pa} at $SSB=B_{pa}$ to 0 at SSB equal to zero. At SSB-levels below B_{pa} in any of the operational years (current year and 3 years of prediction) there should be no limitations on the year-to-year variations in TAC.*

The HCR has the objectives of maintaining high long-term yield, year-to-year stability, and full utilization of all available information on the stock dynamics. The plan aims to maintain target F at $F_{pa} = 0.35$ and minimize between-year TAC change to +/- 15%, unless SSB falls below B_{pa} in which case the management targets should change.

ICES has evaluated the Harvest Control Rule (HCR) and concluded that it is consistent with the precautionary approach under the conditions that the assessment uncertainty and error are not greater than those calculated from historic data. This also holds true when an implementation error (difference between TAC and catch) equal to the historic level of 3 % is included. The proposed management plan is in accordance with the precautionary approach and ICES therefore advises according to this plan.

PRECAUTIONARY REFERENCE POINTS: The reference points were recalculated at the 2005 WG using the standard approaches for the determination of reference points within ICES, taking into account the changes in the age groups used in the calculation of fishing mortality (F_{bar}). The reference points, derived using standard ICES approach, are provided below. The new reference points are $B_{pa} = 220,000$ t, $B_{lim} = 136,000$ t, $F_{pa} = 0.35$, $F_{lim} = 0.58$

STOCK STATUS: Based on the most recent estimates of SSB and fishing mortality, ICES classifies the stock as having full reproductive capacity and to be harvested sustainably. Fishing mortality is stable and has been well below F_{pa} since 1996. Since 1994, SSB has been well above B_{pa} . Recruitment in 2005 was the highest in the time-series..

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the existing management plan which results in a TAC of 204,000 t in 2010

Exploitation boundaries in relation to proposed and evaluated management plan: The implemented management plan implies a TAC based on the average of predicted catches for the coming 3 years at F_{pa} . This results in a TAC of 204 000 t in 2010, and a fishing mortality of 0.30.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential and considering ecosystem effects: The current fishing mortality is lower than the F associated with high long-term yield when applied within the agreed HCR.

Exploitation boundaries in relation to precautionary limits: The implemented management plan has been found to be consistent with the precautionary approach and ICES therefore advises according to this plan. This results in a TAC of 204 000 t in 2010.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED MANAGEMENT PLAN for Northeast Arctic saithe.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach. STECF therefore advises that according to the agreed management plan the TAC for 2010 should be set at 204,000 t.

10.6. Redfish (*Sebastes mentella*) in Sub-areas I and II

FISHERIES: Traditionally, the directed fishery has been conducted by Russia and other East-European countries in the areas from south of Bear Island to Spitsbergen. From the mid-1970s to the mid-1980s, large catches were taken. In the mid-1980s, Norwegian trawlers started fishing along the continental slope (around 500-m depth) further south, in areas never harvested before, and inhabited primarily by mature fish. After a sharp decrease in the landings from the traditional area until 1987, this fishery on new grounds resulted in a temporary increase in the landings until 1991, after which the landings declined. Since 1991, the fishery has been dominated by Norway and Russia.

By-catches are taken in gadoid and shrimp-trawl fisheries. After the introduction of sorting grids in 1993, discarding in the shrimp fishery was reduced. Small redfish less than 18–20 cm are not sorted out by the grid but their catches are regulated by the maximum number of redfish per kilogram shrimp (from 2006 onwards, i.e. 3 juvenile redfish per 10 kg shrimp).

Since 1 January 2003, all directed trawl fisheries for *S. mentella* have been forbidden in the Norwegian EEZ north of 62°N and in the Svalbard area. Additional protection for adult *S. mentella* comprises area closures. Outside permanently closed areas it is, however, legal to have up to 20% redfish (*S. mentella* and *S. marinus* combined) in round weight as by-catch per haul and on-board at any time when fishing for other species. Since 1 January 2005, the by-catch percentage has been reduced to 15% (both species combined).

A directed pelagic fishery for *S. mentella* in international waters of the Norwegian Sea outside EEZ has developed since 2004. Landings of *S. mentella* taken in the pelagic fishery for blue whiting and herring in the Norwegian Sea have been reported in 2004 and 2005. In 2006, this fishery developed further to become a directed fishery with 13 countries and more than 40 trawlers landed around 28,000 t. Catches in 2007 and 2008 have decreased significantly (16,000 and 9,000 t, respectively) due to TACs set by NEAFC and decreased economic value of redfish.

MANAGEMENT AGREEMENTS: The *S. mentella* occurrences inside the Norwegian and Russian EEZs are currently managed by a joint Norwegian and Russian scientific advisory body. The fisheries are regulated according to bilateral agreements between Russia and Norway. NEAFC has set a TAC for the *S. mentella* in international waters in the Norwegian Sea in 2007 (15,500 t) and 2008 (14,500 t). The 2009 TAC is 10,500 t.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICES. ICES notes that it was not possible to conduct an analytical assessment of this stock. Information, therefore, is based on Norwegian and Russian research vessel surveys carried out since 1980. These surveys provide information on both recruitment and spawning stock biomass. The management body of the pelagic redfish fishery is NEAFC. Data from national

Norwegian and Russian experimental surveys on pelagic redfish in the Norwegian Sea in 2007 are available. In 2008, the first international survey was carried out.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be fully evaluated. Surveys indicate that the demersal stock is currently near a historical low. The only year-classes that can contribute to the spawning stock are those prior to 1991 as all of the following year-classes have been extremely poor.

The state of the pelagic occurrences of *S. mentella* is unknown.

RECENT MANAGEMENT ADVICE: The new data (landings and survey) available for this stock do not change the perception of the stock in the Barents Sea and Svalbard area. The advice on this stock for the fishery in 2010 is therefore the same as the advice given in 2007 for the 2008 fishery and re-iterated in 2008 for the 2009 fishery: **There should be no directed trawl fishery on *Sebastes mentella* in Subareas I and II in 2010. Area closures should be maintained and by-catch limits should be as low as possible until a significant increase in the spawning-stock biomass (and a subsequent increase in the number of juveniles) has been verified.**

Other consideration:

Results from the pelagic survey conducted in 2008 indicate a significant, but unquantifiable, spawning biomass in the Norwegian Sea. There are indications, however, that recruitment in the next 12-15 years will be low. A limited fishery is prosecuted at present.

STECF COMMENTS: STECF agrees with the ICES advice and notes that this implies closure of all fisheries in I&II that catch redfish. If this cannot be achieved, STECF **recommends** that measures should be taken to ensure a significant reduction in fishing mortality in 2010, which should be maintained in subsequent years until recovery is achieved.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that redfish (*Sebastes mentella*) in Sub-areas I and II can be classified under Category 10.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

2010 TAC	Basis
Category 10 NE*	STECF advice on catch level, $\geq 25\%$ reduction in TAC

*NE = no TAC given for demersal *S. mentella*

10.7. Redfish (*Sebastes marinus*) in Sub-areas I and II

FISHERIES: The fishery is mainly conducted by Norway, accounting for 80-90% of the historical total catch. The fish are caught mainly by bottom otter trawl (at present only as by-catch) and gillnet, and to a lesser extent by longline, Danish seine, and handline, in that order. Some of the catches are taken in mixed fisheries together with saithe and cod. Important fishing grounds are the Møre area (Svinøy), Halten Bank, outside Lofoten and Vesterålen, and at Sleppen outside Finnmark. Traditionally, *S. marinus* has been the most popular and highest priced redfish species. In the period 1984-90, landings of *S. marinus* were at a level of 23,000–30,000 t. In the period 1991-1999, the landings were around 17,000 t but since then have decreased, and from 2004 to 2007, annual landings were estimated to be about 7,000 t. The 2008 landings were 6,300 t. EU landings reached 388 t in 2007 and about 227 t in 2008.

Since 1 January 2003, all directed trawl fisheries for *S. marinus* have been forbidden in the Norwegian EEZ north of 62°N and in the Svalbard area. A minimum legal landing size of 32 cm has been set for all Norwegian fisheries and international fisheries in the Norwegian EEZ, with an allowance to have up to 10% undersized (i.e., less than 32 cm) specimens of *S. marinus* (in numbers) per haul. From January 2006, it is forbidden to use gillnets with mesh size less than 120 mm when fishing for redfish. The closed seasons enforced since 2004 seem

to have reduced the gillnet catches by about 2,500 t, while the catches taken by other gears have not decreased, and in some cases increased, causing the total international catches to remain at the same level during the last 6 years.

MANAGEMENT AGREEMENTS: The stock is currently managed by a joint Norwegian and Russian scientific advisory body and regulated according to bilateral agreements between Russia and Norway.

SOURCE OF MANAGEMENT ADVICE: No explicit management objectives have been established for this stock. Information is based on Norwegian and Russian research vessel surveys carried out since 1986 as well as from CPUE (kg per trawl hour) from Norwegian trawlers since 1992. An exploratory assessment was conducted using a simulation model covering the period 1986-2006. Input data included catches and the annual Barents Sea joint bottom trawl survey. Work on that model is continuing.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been established for this stock

STOCK STATUS: In the absence of defined reference points, the state of the stock cannot be fully evaluated. Surveys and commercial CPUE show a substantial reduction in abundance and indicate that the stock at present is historically low. Information on year-class strength indicates record-low levels for the last decade. Therefore, this stock is presently in very poor condition. Given the low productivity of this species, this situation is expected to remain for a considerable period.

RECENT MANAGEMENT ADVICE: The new data (landings and survey) available for this stock do not change the perception of the stock. The advice on this stock for the fishery in 2010 is therefore the same as the advice given in 2007 for the 2008 fishery and re-iterated in 2008 for the 2009 fishery: **There should be no directed fishery on *Sebastes marinus* in Subareas I and II in 2010. Area closures should be maintained and by-catch limits should be kept as low as possible until a significant increase in the spawning-stock biomass (and a subsequent increase in the number of juveniles) has been verified.**

STECF COMMENTS: STECF agrees with the advice from ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that redfish (*Sebastes marinus*) in Sub-areas I and II can be classified under Category 10.

2010 TAC	Basis
Category 10 NE*	STECF advice on catch level, $\geq 25\%$ reduction in TAC

*NE = no TAC given for *S. marinus*

10.8. Greenland halibut (*Reinhardtius hippoglossoides*) in area I and II

FISHERIES: The regulations enforced in 1992 reduced the total landings of Greenland halibut by trawlers from about 20,000 to 8,600 t. Since then annual trawler landings have varied between 9,000 and 20,000 t without any clear trend attributable to changes in allowable by-catch. In 2008, the landings were estimated to amount to 13,000 t.

Since 1992, the fisheries have been regulated by allowing a directed fishery only by small coastal longline and gillnet vessels. By-catches of Greenland halibut in the trawl fisheries have been limited by permissible by-catch per haul and an allowable by-catch retention limit on board the vessel.

In recent years, EU Member State catches have been between 300 t and 500 t.

SOURCE OF MANAGEMENT ADVICE: This stock is currently managed by a joint Norwegian and Russian scientific advisory body. The fisheries are regulated according to bilateral agreements between Russia and Norway. ICES has been approached for advice on biological assessment and management of this stock. An exploratory assessment was based on commercial catch-at-age data, two survey series, and one commercial cpue series. The assessment is uncertain due to age-reading problems and lack of contrast in the data.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points are defined for this stock.

STOCK STATUS: In the absence of defined reference points the status of the stock cannot be fully evaluated. The tentative assessment (undertaken in 2007) indicates that SSB has been low since the late 1980s, but a slight increase is indicated until 2004. After 2004 the SSB has decreased again. There are indications of a decreasing trend in fishing mortality since the 1990s. Recruitment has been stable at a low level since the 1980s. Recent recruitment estimates are very uncertain.

RECENT MANAGEMENT ADVICE: The new data (landings, survey and CPUE) available for this stock do not change the perception of the stock and give no reason to change the advice from that given last year in 2008. Therefore, the advice for the fishery in 2010 is the same as the advice given in 2008 for the 2009 fishery: *“The stock has remained at a relatively low size in the last 25 years at catch levels of 15 000–25 000 t. In order to increase the SSB, catches should be kept well below that range. Catches should be below 13 000 t as advised since 2003; this is the level below which SSB has increased in the past”..*

This advice will be updated in 2010. ICES notes that the evaluation of this stock is uncertain due to age-reading problems and lack of contrast in the data. The age-reading issue is being addressed and should be resolved in the not too distant future. Corrections to the whole time-series are required.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Greenland halibut in area I and II can be classified under Category 6.

Accordingly STECF notes that the rule for the above category implies the following option for TACs in 2010.

	2010 TAC	Basis
Category 6	13,000t	STECF advice on catch level

10.9. Barents Sea Capelin (*Mallotus villosus*) in Sub-areas I and II excluding Division IIa west of 5°W.

FISHERIES: Norway and Russia are the two main countries which exploit the capelin stocks in these areas. No fishery took place between autumn 1993 and spring 1999. The fishery was re-opened in the winter of 1999. Since 1979 the fishery has been regulated by a bilateral agreement between Norway and Russia (formerly USSR) and since 1987, catches have been very close to the advice, varying between 100,000 t and 650,000 t. The fishery was closed from 2004-2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The assessment and stock history is based on joint Russia-Norwegian acoustic surveys during September each year. A model incorporating predation from cod has been used for predicting SSB and for estimating the historical time series of SSB (Report from the 2009 joint Russian-Norwegian meeting to assess the Barents Sea capelin stock, Kirkenes, October 3-4 2009.

Report of the Arctic Fisheries Working Group, 21-27 April 2009. ICES CM 2009/ACOM:02.).

PRECAUTIONARY REFERENCE POINTS: The proposed limit reference point for biomass is $B_{lim} = 200,000$ t. No precautionary fishing mortality or biomass reference points have been proposed.

STOCK STATUS: Based on the most recent estimates of SSB and recruitment, ICES classifies the stock as having full reproductive capacity. The maturing component in autumn 2009 was estimated to be 2.3 million tonnes. The spawning stock in 2010 will consist of fish from the 2006 and 2007 year-classes, but the 2006 year-

class will dominate. The survey estimate at age 1 of the 2008 year-class is below the long-term average, while 0-group observations during the joint Russian-Norwegian ecosystem survey in August-September 2009 indicated that the 2009 year-class is strong.

MANAGEMENT OBJECTIVES: The fishery is managed according to a target escapement strategy, with a harvest control rule allowing (with 95% probability) the SSB to be above the proposed B_{lim} , taking predation by cod into account. ICES considers the management plans to be consistent with the precautionary approach. The harvest control rule presupposes that all catch is taken during January-April, prior to spawning

RECENT MANAGEMENT ADVICE:

Exploitation boundaries in relation to existing management plans: Following the international agreement between Norway and Russia would imply catches of 360 000 tonnes in spring 2010. Only catches of mature fish have been considered.

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED NORWAY AND RUSSIA HARVEST CONTROL RULE.

STECF notes that this international agreement has been evaluated to be consistent with the precautionary approach.

Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 4	360,000 t	Follow relevant management plan.

10.10. Herring (*Clupea harengus*) in Div. I and II. (Norwegian Spring Spawners)

FISHERIES: The total catches in 2008 were 1.55 million t., mainly taken by Norway (961 000 t), Russia (193 000 t), Iceland (217 000 t), EU (95 000 t), and Faroe Islands 74 000 t). The fishery in general follows the migration of the stock closely as it moves from the wintering and spawning grounds along the Norwegian coast to the summer feeding grounds in the Faroese, Icelandic, Jan Mayen, Svalbard, and international areas. Due to limitations for some countries to enter the EEZs of other countries in 2008, the fisheries do not necessarily depict the distribution of herring in the Norwegian Sea. A special feature of the summer fishery in 2005 and 2006 was the prolonged fishery in the Faroese and Icelandic zone. In 2007 and 2008 a clean herring fishery was hampered by mixture of mackerel schools in the area. This was especially the case for the Faroese fleet, which usually targets mackerel later in the year (October–November).

A large increase in fishing effort, new technology, and environmental changes contributed to the collapse of this stock around 1970. Recruitment failed in the second half of the 1960s when the SSB was reduced below 2.5 million t. Starting in 1989, a succession of above-average to very strong year-classes were produced, promoting full recovery of the SSB and allowing an expansion of the fishery. Management regulations have restricted landings in recent years.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an analytical assessment, which takes into consideration catch data and eight surveys (acoustic surveys of adults and juveniles, larval survey, and 0-group survey). ICES investigated the use of a number of different models. When appropriately formulated, they all gave a similar perception of the trajectory for stock size and fishing mortalities. On this basis, the TASACS model was used. The present assessment is an updated assessment, using the models, configurations and procedures agreed at the benchmark assessment in 2008.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for biomass and fishing mortality are $B_{pa} = 5$ million t, $B_{lim} = 2.5$ million t. $F_{pa} = 0.15$. F_{lim} is not defined.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) ICES classifies the stock as having full reproductive capacity. Based on the most recent estimate of fishing mortality (in 2008) ICES classifies the stock as being harvested sustainably.

SSB in 2009 is well above B_{pa} and is estimated as one of the highest in the time-series. The stock contains a number of good year classes. In the last 10 years, four large year classes have been produced (1998, 1999, 2002 and 2004). However, the available information indicates that year classes after 2004 have been of low abundance.

RECENT MANAGEMENT ADVICE: In 1999 EU, Iceland, Faroe Islands, Norway and Russia agreed on a long-term management plan from 2001. The aim is to maintain the stock size above 2.5 million t and to maintain a fishing mortality rate of 0.125. Should SSB fall to below 5 million t (B_{pa}) the fishing mortality rate shall be adapted to ensure a rapid recovery of SSB to the B_{pa} level. This plan is considered by ICES to be precautionary and with targets consistent with high long-term yield and low risk of depletion production potential. The management plan implies maximum catches of 1 483 000 t in 2010, which is expected to leave a spawning stock of 10.8 million t in 2011.

In June 2009, an agreement was concluded between contracting parties to the Coastal States on mackerel banning highgrading, discarding, and slipping from pelagic fisheries targeting mackerel, horse mackerel, and herring beginning in January 2010.

STECF COMMENTS: STECF agrees with the advice from ICES.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO THE AGREED EU, ICELAND, FAROE ISLANDS, NORWAY AND RUSSIA MANAGEMENT PLAN.

STECF notes that this plan has been evaluated to be consistent with the precautionary approach.

Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

	2010 TAC	Basis
Category 4	1 483 000 t	Follow relevant management plan.

11. Resources in the Faeroe plateau ecosystem

11.1. Cod (*Gadus morhua*) in Vb1 (Faroe Plateau cod)

FISHERIES: Faroe plateau cod are taken in a mixed demersal fishery, which was initially international. Following the declaration of EEZs in the 1970s, the fishery became largely Faroese and fishing mortality declined briefly but it has increased since to former high levels. Most of the vessels involved are trawlers and longliners. Landings have fluctuated between 6,000 and 40,000 t (1986-2007), almost entirely taken by non-EU fleets. In 2007 landings were 8,100 t, the lowest observed since 1993.t. Landings in 2008 were 10,500 t. The EU fishery on this stock has been managed together with cod in VI, Vb (EC waters), International waters of XII and XIV.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES. The advice is based on an analytical method using survey and catch-at-age data. The technique was XSA calibrated by two research surveys.

PRECAUTIONARY REFERENCE POINTS: The proposed reference points for this stock are $F_{pa} = 0.35$ and $B_{pa} = 40,000$ t and limit reference points of $F_{lim} = 0.68$ and $B_{lim} = 21,000$ t .

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) and fishing mortality (in 2008), ICES classifies the stock as suffering reduced reproductive capacity and as being harvested unsustainably. Most year-classes from 2001 onwards have been around one third of the long-term average.

MANAGEMENT OBJECTIVES: The management objective is to achieve sustainable fisheries. An effort management system was implemented in the Faroese demersal fisheries in Division Vb in 1996. From the outset

the aim of the effort management system was to harvest on average 33% in numbers of the exploitable stock of cod. This translates into an average F of approximately 0.45, above the F_{pa} of 0.35. ICES considers this to be inconsistent with the precautionary approach.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the precautionary approach to close the fishery in the fishing season 2009/2010 and to develop a recovery plan aimed at rapidly rebuilding the stock to above B_{pa} .

Other considerations

Exploitation boundaries in relation to existing management plans: The management objective implied in the effort management scheme is to achieve an average exploitation rate equivalent to a fishing mortality of 0.45, compared to the current estimate of 0.76 in 2008, and 0.60 for the last twelve years. Assuming proportionality between effort and F , adherence to the management plan would imply a 25% reduction in effort for 2010 compared with the average fishing mortality the last five years.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential, and considering ecosystem effects: The current fishing mortality estimated as 0.76, and the average F for 1997-2008 = 0.60, is well above rates that would support an optimal yield and low risk of stock depletion ($F_{0.1}$ and F_{MAX}).

Exploitation boundaries in relation to precautionary limits: Taking into account the current perception of the stock abundance and recruitment, fishing at any level will lead to the stock remaining below B_{pa} in 2011. ICES therefore recommends a closure of the fishery in the fishing season 2009/2010 and a development of a recovery plan aimed at rapidly rebuilding the stock to above B_{pa} .

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Faroe Plateau cod should be classified under Category 10.

Accordingly STECF notes that the rules for each of the above categories imply the following options for TACs in 2010.

2010 TAC	Basis
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Category 10	NE*	Advice for zero catch, TAC = 25% reduction.
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*NE = not estimable. In the absence of an agreed TAC for Faroe Bank cod, STECF is unable to advice on a 25% reduction.

11.2. Cod (*Gadus morhua*) in Vb2 (Faroe Bank cod)

FISHERIES: during the recent 10 years total catches for this stock have fluctuated between 4000 and 200 t. In the latest years EU landings have constituted 10-20% of the total. The EU fishery on this stock has been managed together with cod in VI, Vb (EC waters), International waters of XII and XIV.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is ICES.

PRECAUTIONARY REFERENCE POINTS: Biological reference points have not been defined for this stock.

STOCK STATUS: There is no analytical assessment for this stock. Survey indices indicate that the stock is severely depleted. Catches have declined strongly in the last three years despite a marked increase in the exploitation rate.

MANAGEMENT OBJECTIVES: There are no explicit management objectives for this stock

RECENT MANAGEMENT ADVICE: The new data (landings and survey indices) available for this stock do not change the perception of the stock and give no reason to change the advice from that given last year in 2008. Therefore, the advice for the fishery in 2010 is the same as the advice given in 2008 for the 2009 fishery: "Because of the very low stock size ICES advises that the fishery should be closed. Reopening the fishery

should not be considered until both survey indices indicate a biomass at or above the average of the period 1996–2002“

STECF COMMENTS: STECF agrees with the ICES advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Norwegian coastal cod should be classified as Category 10.

Accordingly STECF notes that the rules for category 10 imply the following TAC for 2010.

	2010 TAC	Basis
Category 10	NE*	Advice for zero catch, TAC = 25% reduction.

*NE = not estimable. In the absence of an agreed TAC for Faroe Bank cod, STECF is unable to advise on a 25% reduction.

11.3. Haddock (*Melanogrammus aeglefinus*) in area Vb (Faroe)

FISHERIES: Faroe haddock are taken as part of a mixed demersal fishery, with most taken by trawls or longlines. Landings are predominantly Faroese, with only low EU landings. Since 1988 total landings from Vb have increased from 4,000 t to 27,000 t in 2003 but have dropped to 7,582t in 2008. The management is by effort restrictions through individual transferable days introduced in 1996. The fishing law also prescribes fleet specific catch compositions of cod, haddock, saithe, and redfish.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is ICES. The advice is based on an age-based assessment using commercial landings and age disaggregated data from two surveys.

PRECAUTIONARY REFERENCE POINTS: The proposed precautionary reference points for this stock are $F_{pa} = 0.25$ and $B_{pa} = 35,000$ t.

STOCK STATUS: Based on the most recent estimates of SSB (in 2009) and fishing mortality (2008), ICES classifies the stock as being at risk of reduced reproductive capacity but being harvested sustainably. The fishing mortality in 2008 is estimated just below F_{pa} . SSB increased until 2003 as a result of strong recruitments, including the record-high 1999 year-class, but has declined since. Recruitment of the year-classes from 2003 onwards has been well below average.

RECENT MANAGEMENT ADVICE:

ICES advises on the basis of the precautionary approach to close the fishery in the fishing season 2009/2010 and to develop a recovery plan aimed at rapidly rebuilding the stock to above B_{pa}

Other considerations

Exploitation boundaries in relation to existing management plans:

The management objective implied in the effort management scheme is to achieve an average exploitation rate equivalent to a fishing mortality of 0.45, compared to the current estimate of 0.22 in 2008, and the average fishing mortality 1997–2008 of 0.36.

Exploitation boundaries in relation to high long-term yield, low risk of depletion of production potential, and considering ecosystem effects:

The current fishing mortality, estimated at 0.22, and the average fishing mortality 1997–2008 of 0.36. is above $F_{0.1}$ (0.18).

Exploitation boundaries in relation to precautionary limits:

Given the recent poor recruitment and slow growth and the rapidly declining SSB, the forecast indicates that even a zero fishing mortality in 2010 will not result in getting the stock above B_{pa} in 2011. ICES recommends to close the fishery in the fishing season 2009/2010 and to develop a recovery plan aimed at rapidly rebuilding the stock to above B_{pa} .

STECF COMMENTS: STECF agrees with ICES' advice.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that this stock can be classified under Category 10.

Category 10 STECF advises a zero catch, a reduction to the lowest possible level or similar advice. Accordingly STECF notes that the rules for category imply the following TAC for 2010.

2010 TAC	Basis
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Category 10	NE*	Advice for zero catch, TAC = 25% reduction.
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*NE = not estimable. In the absence of an agreed TAC for Faroe Bank haddock, STECF is unable to advise on a 25% reduction.

11.4. Saithe (*Pollachius virens*) in Division Vb (Faroe saithe).

Advice for this stock is given in Section 2.7

12. Stocks of the North West Atlantic (NAFO)

12.1. American plaice (*Hippoglossoides platessoides*) in Divisions 3L, 3N and 3O

Multi-year Advice for 2010-2011 was provided for this stock in 2009.

FISHERIES: Historically, American plaice in Div. 3LNO, has comprised the largest flatfish fishery in the Northwest Atlantic.

In most years the majority of the catch has been taken by offshore otter trawlers. There was no directed fishing in 1994 and there has been a moratorium since 1995. Catches increased after the moratorium until 2003 after which they began to decline. Total catch in 2006 was 2 800 tons, 3 620 t in 2007 and 2 500 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on biomass and abundance data from several surveys as well as on age sampling from Canadian by-catch and length, sampling from Russia, EU-Spain and EU-Portugal. An analytical assessment using the ADAPTive framework tuned to the Canadian spring and autumn surveys and Spanish Div. 3NO survey was used.

PRECAUTIONARY REFERENCE POINTS: Good recruitment has rarely been observed in this stock when SSB has been below 50 000 tons and this is currently the best estimate of B_{lim} . In the current assessment SC adopted an F_{lim} of 0.4 consistent with stock history and dynamics for this stock. The stock is currently below B_{lim} and current fishing mortality is below F_{lim} .

STOCK STATUS: The stock remains low compared to historic levels although SSB is approaching B_{lim} . Estimated recruitment at age 5 indicates that the 2003 year class is the largest since the 1985 year class. Since

1995, the average fishing mortality on ages 9 to 14 increased but since 2003 has declined. **RECENT MANAGEMENT ADVICE:** : There should be no directed fishing on American plaice in Div. 3LNO in 2010 and 2011. By-catches of American plaice should be kept to the lowest possible level and restricted to unavoidable by-catch in fisheries directing for other species. The Scientific Council notes that levels of bycatch allowed for this stock in the yellowtail flounder fishery has been increased for 2010 and 2011 and this is likely to result in an increase in fishing mortality.

The next full assessment of this stock will be conducted in 2011.

STECF COMMENTS: STECF agrees with the advice from NAFO remarking that the level of catches is too high for a stock under moratorium.

12.2. American plaice (*Hippoglossoides platessoides*) in Divisions 3M (Flemish Cap)

Multi-year Advice for 2009-2011 was provided for this stock in 2008.

FISHERIES: On Flemish Cap, the stock of American plaice mainly occurs at depths shallower than 600 m. Catches of Contracting Parties, in recent years, are mainly taken as by-catch in trawl fisheries directed at other species in this Division. Nominal catches increased during the mid-1960s, reaching a peak of about 5,300 tons in 1965, followed by a sharp decline to values less than 1,100 tons till 1973. Since 1974, when this stock became regulated, catches ranged from 600 t (1981) to 5,600 t (1987). Subsequently, catches declined to 275 t in 1993, caused partly by a reduction in directed effort by the Spanish fleet in 1992. From 1979 to 1993 a TAC of 2,000 t was agreed for this stock. A reduction to 1,000 tons was agreed for 1994 and 1995 and a moratorium has been in place since 1996. The catch for 2007 was estimated to be 76 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on biomass and abundance data from surveys carried out by USSR/Russia (1972-2002), EU (1988-2007) and Canada (1978-1986). Age-length keys were available from EU surveys (1988-2007). Length compositions were available from the 1988 to 2007 fisheries. In 2008 an analytical assessment (XSA) was performed.

PRECAUTIONARY REFERENCE POINTS: Based on the 18 years data available from the XSA to examine a stock/recruitment relationship, a proxy for Blim will be 5 000 tons of SSB.

STOCK STATUS: The stock biomass and the SSB are at a very low level and there is no sign of recovery.

RECENT MANAGEMENT ADVICE: There should be no directed fishery on American plaice in Div. 3M in 2009, 2010 and 2011. Bycatch should be kept at the lowest possible level.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.3. Capelin (*Mallotus villosus*) in Divison 3N and 3O.

Multi-year Advice for 2010-2012 was provided for this stock in 2009.

FISHERIES: There has not been a directed fishery since 1993 when a moratorium was established and no commercial catches have been reported since then.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. Capelin catches from Canadian bottom trawl surveys conducted in 1990-2008, as well as historical data sets from Russian and Canadian trawl acoustic surveys directed to capelin.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: It is not clear that the data satisfactorily reflect the stock distribution and stock status. Nevertheless, and in spite of recent increases in survey indices, SC was unable to consider that the stock is at other than a relatively low level.

RECENT MANAGEMENT ADVICE: Scientific Council noted that NAFO recognizes the role that capelin play in the Northwest Atlantic ecosystem as a very important prey species for fish, marine mammals and seabirds. Scientific Council recommends no directed fishery on capelin in Div. 3NO in 2010-2012.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.4. Cod (*Gadus morhua*) in Division 2J, 3K and 3L.

The management advisory body for this stock is the Canadian Science Advisory Secretariat and any management decision is completely undertaken by Canada. NAFO Scientific Council is no longer requested by the Coastal State of Canada to provide management recommendations or advice on the status of this stock.

12.5. Cod (*Gadus morhua*) in Division 3M (Flemish Cap)

Information on this stock is updated from NAFO Scientific Council Reports, 2009.

FISHERIES: The fishery is under moratorium since 1999. Yearly bycatches between 2000 and 2005 were below 60 t, rising to 339 and 345 t in 2006 and 2007, respectively. In 2008 catches increased to 889 tons.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. Length and age compositions of the 2002-2005 bycatch were not available. Length distributions were available for 2006 - 2008, although sampling levels were low. Abundance at age indices were available from the EU bottom trawl survey since 1988, covering the whole distribution area of the stock. Survey age-length keys were applied to the bycatch.

An analytical assessment based on an age-structured model was accepted to estimate the state of the stock.

PRECAUTIONARY REFERENCE POINTS: A spawning biomass of 14 000 t has been identified as *Blim* for this stock. There is a high probability that spawning biomass is above *Blim* in 2009.

STOCK STATUS: Despite the significant spawning biomass increase, stock numbers are still much lower than before 1995. As a result of changes noted in weight and maturity, it is unclear whether the meaning of spawning biomass as an indicator of stock status is the same as in the earlier period. Whereas recruitment has been better during 2005-2008, it is below levels in the earlier period. **RECENT MANAGEMENT ADVICE:** Scientific Council considers that there is sufficient evidence to allow a small amount of directed fishing on this stock. Considering the relatively low number of mature individuals currently in the stock, Scientific Council advises that a fishing mortality for 2010 not to exceed F2008 (TAC of 4125 t) will allow further recovery of the stock.

STECF COMMENTS: STECF notes that the Scientific council management advice of fishing at F2008, corresponds to a TAC of 4125t for 2010. STECF notes that the NAFO Fisheries Commission has set a TAC of 5500 t for 2010 which corresponds to a fishing mortality rate less than F0.1 and is consistent with the NAFO precautionary approach.

12.6. Cod (*Gadus morhua*) in Divisions 3N and 3O

Multi-year Advice for 2008-2010 was provided for this stock in 2007.

FISHERIES: This stock occupies the southern part of the Grand Bank of Newfoundland. Cod are found over the shallower parts of the bank in summer, particularly in the Southeast Shoal area (Div. 3N) and on the slopes of the bank in winter as cooling occurs. There has been no directed fishery since mid-1994 but catches increased steadily during this moratorium to 2003. The total catch of cod for 2007 in Div. 3NO from all fisheries was estimated to be 845 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. Length and age composition data were available from the 2005 and 2006 fisheries to estimate the total removals at age. Canadian spring (1984-2005) and autumn (1990-2006) survey data provided abundance, biomass and age structure information. Canadian juvenile research survey data were available up to 1994. Canadian Cooperative Industry surveys were available from 1996-2004. Spanish Div. 3NO surveys were available from 1997-2006.

An analytical assessment was presented to estimate population numbers in 2007.

PRECAUTIONARY REFERENCE POINTS: The current best estimate of *Blim* is 60 000 tons. It was also concluded that in the recent period of low productivity, there is an indication of even further reduction in

recruitment at about half the *Blim* level. The Scientific Council will review in detail the biological reference points in the context of the PA framework when the SSB has reached half the current estimate of *Blim*.

STOCK STATUS: In 2007 the assessment concluded that the total biomass and spawning biomass were estimated to be at extremely low levels. Based on overall indices for the current year, there is nothing to indicate a change in the status of this stock. It is too early to determine if the 2006 and 2005 year-classes are larger than other recent cohorts.

RECENT MANAGEMENT ADVICE: There should be no directed fishing for cod in Div. 3N in 2008, 2009 and 2010. Bycatches of cod should be kept to the lowest possible level and restricted to unavoidable bycatch in fisheries directed for other species. Efforts should be made to reduce current levels of bycatch. The next full assessment will be in 2010.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.7. Greenland Halibut (*Reinhardtius hippoglossoides*) in Sub-area 2 and Divisions 3KLMNO

Information on this stock is updated from NAFO Scientific Council Reports, 2009.

FISHERIES: TACs prior to 1995 were set autonomously by Canada; subsequent TACs have been established by Fisheries Commission. Catches increased sharply in 1990 due to a developing fishery in the NAFO Regulatory Area in Div. 3LMNO and continued at high levels during 1991-94. The catch was only 15 000 to 20 000 tons per year in 1995 to 1998 as a result of lower TACs under management measures introduced by the Fisheries Commission. The catch increased since 1998 and by 2001 was estimated to be 38 000 tons, the highest since 1994. The estimated catch for 2002 was 34 000 tons. The 2003 catch could not be precisely estimated, but was believed to be within the range of 32 000 tons to 38 500 tons. A fifteen year rebuilding plan for this stock has been implemented by Fisheries Commission. The catches in 2004 - 2008 have exceeded the rebuilding plan TACs by 30% on average, despite reductions in fishing effort. The 2008 catch was estimated to be 21 000 tons.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. Standardized estimates of CPUE were available from fisheries conducted by Canada, EU- Spain and EU-Portugal. Abundance and biomass indices were available from research vessel surveys by Canada in Div. 2+3KLMNO (1978-2008), EU in Div. 3M (1988-2008) and EU-Spain in Div. 3NO (1995-2008). Commercial catch-at-age data were available from 1975-2008. The Canadian autumn survey of 2008 is not comparable with previous years due to survey coverage deficiencies. An analytical assessment using Extended Survivors Analysis (XSA) tuned to the Canadian spring (Div. 3LNO; 1996-2007), and autumn (Div. 2J, 3K; 1996-2007) and the EU (Div. 3M; 1995-2007) surveys has been used up to 2009 to estimate the 5+ exploitable biomass, level of exploitation and recruitment to the stock.

In 2009 however, SC reviewed the impact of the incomplete survey coverage of the Canadian fall survey. It was determined that the coverage deficiencies within Divs. 2J3K were such that the mean numbers per tow index from Divs. 2J3K could not be considered comparable to that of previous years. This survey index has been used to calibrate the XSA in recent years and has received the majority of the weight used to estimate the survivors. It is therefore critical to the XSA assessment that the indices from this survey are consistent from year to year and the Scientific Council concluded that it would not be appropriate to update that analytical assessment as the Canadian Div. 2J3K data for 2008 were not comparable to those from previous years.

PRECAUTIONARY REFERENCE POINTS: Limit reference points could not be determined for this stock. For this stock F_{max} is estimated to be 0.34 and $F_{0.1}$ is 0.18 based upon average weights and partial recruitment patterns from the past 3 years.

STOCK STATUS: Given that SC did not consider it appropriate to update the analytical assessment, overall stock status has been based upon estimates from the previous assessment. At that time, SC noted that the exploitable biomass has been declining in recent years and the 2004-2008 estimates are amongst the lowest in the series. Recent recruitment has been far below average, and fishing mortality, although decreasing, remains high.

RECENT MANAGEMENT ADVICE: To provide a consistent increase of the 5+ exploitable biomass, Scientific Council **recommended** that fishing mortality in 2010 should be reduced to a level not higher than $F_{0.1}$.

The Council reiterates its concern that the catches taken from this stock consist mainly of young, immature fish of ages several years less than that at which sexual maturity is achieved. In recent years, the proportion of older individuals in the catch has decreased. Scientific Council noted that the prospects of rebuilding this stock have, to date, been hampered by catches that have exceeded the Rebuilding Plan TACs.

Scientific Council expressed concern that most of the year-classes which will recruit to the exploitable biomass in coming years (as estimated from the 2008 assessment) have been estimated to be well below average.

SC reviewed the issue of using CPUE indices in the assessment and confirmed its view that CPUE indices for this stock should not be interpreted to reflect stock size.

During previous assessments, Scientific Council has noted that fishing effort should be distributed in a similar fashion to biomass distribution in order to ensure sustainability of all spawning components.

STECF COMMENTS: STECF agrees with the advice given by NAFO. STECF regrets that due to incomplete coverage of one of the most important survey for the assessment of this stock, no analytical assessment could be carried in 2009. STECF is also concerned by the internal inconsistency in surveys indices causing a strong retrospective pattern. Although a specific workshop was held in 2009 to investigate different assessment models, nothing conclusive could be drawn from this work. More work is needed to better assess this stock and the first priority to achieve this is to maintain consistent time series of survey data.

12.8. Greenland Halibut (*Reinhardtius hippoglossoides*) in Sub-area 0 + Division 1A Offshore and Divisions 1B-1F

Information on this stock is updated from NAFO Scientific Council Reports, 2009. **FISHERIES:** Before 1984, USSR and GDR conducted trawl fisheries in the offshore part of Div. 0B. In the late-1980s catches were low and mainly taken by the Faeroe Islands and Norway. In the beginning of the 1990s catches taken by these two countries increased and Canada, Russia and Japan entered the fishery. In 1995 a Canadian gillnet fishery began. In 1997 and 1998 only Faeroe Island and Canada conducted a fishery in the area. Besides Canadian trawlers, trawlers from four different countries chartered by Canada participated in the trawl fishery in Div. 0A in 2001-2003. In 2004 all catches (3 740 tons) in Div. 0A were taken by Canadian vessels, almost exclusively trawlers.

In Div. 1A offshores and Div. 1B-1F almost all catches are taken offshore mainly by trawlers from Japan, Greenland, Norway, Russia, Faeroe Islands and EU (mainly Germany).

Due to an increase in offshore effort, catches increased from 3 000 t in 1989 to 18 000 t in 1992 and remained at about 10 000 t until 2000. Since then catches increased gradually to 24 000 t in 2006 primarily due to increased effort in Div. 0A and in Div. 1A. Catches were 22 000 t in 2008. **SOURCE OF MANAGEMENT ADVICE:** The main management advisory body is NAFO. No analytical assessment could be performed. Combined standardized catch rates in Div. 0A and Div. 1AB have been stable since 2002. The combined Div. 0B and 1CD standardized catch rates have been stable in the period 1990-2001, declined somewhat in 2002 remained at that level in 2003 and 2004. Since then the standardized catch rates have increased gradually and were in 2008 at the highest level seen since 1989.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Div 0A+1AB: Length compositions in the catches have been stable in recent years. Survey biomass in Div. 0A and CPUE indices in Div. 0A and 1AB have been stable in recent years. Div. 0B+1C-F: Survey biomass in Div. 1CD and CPUE indices in Div. 0B and 1CD have shown an increasing trend in recent years and are at the level observed in the late 1980s.

RECENT MANAGEMENT ADVICE: Div 0A+1AB: Considering the relative stability in biomass and CPUE indices, for Greenland halibut in Div. 0A and 1AB Scientific Council advises that there is no basis to change advice for Div. 0A and Div. 1A off shore + Div. 1B for 2010 and the TAC should not exceed 13 000 t. Div. 0B+1C-F: Taking into account the increasing trends in survey and CPUE indices for Greenland halibut in Div. 0B and Div. 1C-F an increase in TAC can be considered. A 25% increase in catch would raise an index of F to 96% of the long-term mean. Scientific Council advises that the TAC for Greenland halibut in Div. 0B and 1C-F for 2010 should not exceed 14 000 t.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.9. Shrimp (*Pandalus borealis*) in Division 3M (Flemish Cap)

STECF noted that although advice was given in September 2009, the requests for advice on northern shrimp (Northern shrimp in Div. 3M and Div. 3LNO) will be undertaken again during the NAFO Scientific Council Meeting scheduled for 21-29 October 2009). The text below reflects the advice given in September 2009.

FISHERIES: The shrimp fishery in Div. 3M began in 1993. Initial catch rates were favourable and, shortly thereafter, vessels from several nations joined. Between 1993 and 2004 the number of vessels ranged from 40-110. In 2006 there were approximately 20 vessels fishing shrimp in Div. 3M. No information is available on the number of vessels taking part in the shrimp fishery in 2007 and 2008. Total catches were approximately 27,000 tons in 1993, increased to 48,000 tons in 1996, declined in 1997 and increased steadily through 2000. Catches in 2004 were 45 000 tons then dropped to 13 000 tons in 2008 and 3 000 t in 2009 (to September).

The fishery was unregulated in 1993. Sorting grates and related by-catch regulations were implemented in 1996 and have continued to the present day. This stock is now under effort regulation.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. Catch, effort and biological data were available from several Contracting Parties. Time series of size and sex composition data were available mainly from two countries between 1993 and 2005 and survey indices were available from EU research surveys (1988–2009). For lack of samples from the commercial fishery since 2006, length distributions from the EU survey have been used instead. Problems about suspected misreporting of catches since 2005 have been resolved to enable a standardized CPUE series which also accounted for changes in gear (single, double and triple trawl), fishing power and seasonality.

No analytical assessment was available. Evaluation of stock status was based upon interpretation of commercial fishery and research survey data.

PRECAUTIONARY REFERENCE POINTS: Scientific Council considers that 15% of the maximum survey female biomass index, i.e. 2 600 t, is a limit reference point for biomass (Blim) for northern shrimp in Div. 3M. It is not possible to calculate a limit reference point for fishing mortality. The biomass is now estimated to be below Blim.

STOCK STATUS: The indices of biomass in the July 2009 survey showed a sharp decline, confirming recent downward trends, even though the levels of exploitation have been low since 2005. The most recent estimate of stock size is below Blim. Due to the continued poor recruitment, there are also serious concerns that the stock will stay at low levels.

RECENT MANAGEMENT ADVICE: The stock is now below Blim i.e. has now entered the collapse zone defined by the NAFO PA framework, and recruitment prospects remain poor. Therefore, the Scientific Council recommends that the fishing mortality be set as close to zero as possible in 2010.

STECF COMMENTS: STECF agrees with the advice from NAFO on the basis of single stock management. STECF also noted that in its September 2009 report, the Scientific Council agrees that although not fully investigated, an inverse relationship exists between the biomass of cod and the biomass of shrimp. NAFO decided to reopen the 3M cod fishery with a TAC of 5500 t in 2010. However this should not have a strong impact on the cod biomass which is projected to increase further. The status of the shrimp stock will be again reviewed during the October 2009 meeting of the joint ICES/NAFO NIPAG WG. Any management decision should take into consideration the predator/prey relation between cod and shrimp. STECF noted that no management decision has been taken for the shrimp stock yet and that NAFO Fisheries Commission will have an inter-sessional meeting 16 November in London to discuss the issue

12.10. Shrimp (*Pandalus borealis*) in Division 3LNO

STECF noted that although advice was given in September 2009, the requests for advice on northern shrimp (Northern shrimp in Div. 3M and Div. 3LNO (Item 1)) will be undertaken again during the NAFO Scientific Council Meeting scheduled for 21- 29 October 2009). The text below reflects the advice given in September 2009.

FISHERIES: Most of this stock is located in Div. 3L and exploratory fishing began there in 1993. The stock came under TAC regulation in 2000, and fishing has been restricted to Div. 3L. Several countries participated in the fishery in 2008. The use of a sorting grid to reduce bycatches of fish is mandatory for all fleets in the fishery. Catches have fluctuated around 20 000t in recent years.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. Catch, effort and biological data were available from the commercial fishery. Biomass and recruitment indices as well as size and sex composition data were available from research surveys conducted in Div. 3LNO during spring (1999 to 2009) and autumn (1996 to 2008). The Canadian survey in autumn 2004 was incomplete. Analytical assessment methods have not been established for this stock. Evaluation of the status of the stock is based upon interpretation of commercial fishery and research survey data.

PRECAUTIONARY REFERENCE POINTS: Scientific Council considers that the point at which a valid index of stock size has declined by 85% from the maximum observed index level provides a proxy for Blim for northern shrimp in Div. 3LNO. It is not possible to calculate a limit reference point for fishing mortality. The SSB is still expected to be well above Blim, but the 2008 value is not yet available. Scientific Council notes that the most recent values for fishable biomass put the stock above Blim.

STOCK STATUS: Biomass indices peaked in 2007 and have since declined. The most recent survey index, i.e. from spring 2009, is 65% lower than the 2007 value. Scientific Council was unable to update its information on the size distribution of the stock.

RECENT MANAGEMENT ADVICE: The most recent survey results show a steep decline in stock size, and Scientific Council urges caution in the setting of TACs. This downturn in biomass is unexpected as recruitment has been reasonable in recent years. The recent exploitation rates of about 14% may be too high. Scientific Council therefore urges caution in the exploitation of the stock and considers that exploitation rates should not be raised, but kept below recent levels.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.11. Redfish (*Sebastes spp.*) in Divisions 3L and 3N

The Scientific Council reviewed the status of Div. 3LN redfish from an interim monitoring report in June 2009 and found no significant change in the status of this stock. Information on this stock given below is updated from NAFO Scientific Council Reports, 2008.

There are two species of redfish, *Sebastes mentella* and *Sebastes fasciatus*, which occur in Div. 3LN and are managed together. These are very similar in appearance and are reported collectively as redfish in statistics. Most studies the Council has reviewed in the past have suggested a closer connection between Div. 3LN and Div. 3O, for both species of redfish. However, differences observed in population dynamics between Div. 3O and Div. 3LN suggests that it would be prudent to keep Div. 3LN as a separate management unit.

FISHERIES: The average reported catch from Div. 3LN from 1959 to 1985 was about 22 000 t ranging between 10 000 t and 45 000 t. Catches increased sharply from about 21 000 t in 1985, peaked at an historical high of 79 000 t in 1987 then declined steadily to about 450 t in 1996. Catch increased from 900 t in 1998, the first year under a moratorium on directed fishing, to 3 100 t in 2000. Catches declined from 2001 until 2006, with an historic low of 496 t, but recorded over a three time fold increase in 2007 with a catch estimate of 1 660 t. Since 1998 catches were taken as bycatch primarily in Greenland halibut fisheries by EU-Portugal, EU-Spain and Russia.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. Catches from 1959-2007, a 1959-94 CPUE series from STATLANT data (as derived in the 1997 assessment), and most of the stratified-random bottom trawl surveys conducted by Canada and Russia in various years and seasons in Div. 3L and Div. 3N, from 1978 onwards.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The available Div. 3LN survey indices indicate an increase in stock in recent years broadly to level seen in the first half of the 1980s. However the considerable inter-annual variability of the survey indices makes the measurement of the magnitude of the stock increase difficult to quantify. In addition stock

length structure has been improving from small to medium size fish, confirming the survival of recent year-classes regardless of their low sizes and the lack of good recruitment for more than a decade.

RECENT MANAGEMENT ADVICE: Scientific Council recommends that the total catch of Div. 3LN redfish in 2009 not exceed 3 500 t. This total catch should include any directed catches and all bycatches of Div. 3LN redfish taken in other fisheries. Before making a recommendation for 2010, Scientific Council will review this in 2009, when the catch in 2008 is known.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.12. Redfish (*Sebastes spp.*) in Division 3M

Multi-year Advice for 2010-2011 was provided for this stock in 2009.

There are three species of redfish that are commercially fished on Flemish Cap; deep-sea redfish (*Sebastes mentella*), golden redfish (*Sebastes marinus*) and Acadian redfish (*Sebastes fasciatus*). The present assessment evaluates the status of the Div. 3M beaked redfish stock, regarded as a management unit composed of two populations from two very similar species (*Sebastes mentella* and *Sebastes fasciatus*). The reason for this approach is that evidence indicates this is the dominant redfish group on Flemish Cap.

FISHERIES: The redfish fishery in Div. 3M increased from 20 000 tons in 1985 to 81 000 tons in 1990, falling continuously since then until 1998-1999, when a minimum catch around 1 100 tons was recorded mostly as by-catch of the Greenland halibut fishery. An increase of the fishing effort directed to Div. 3M redfish is observed during the first years of the present decade, pursued by EU-Portugal and Russia fleets. A new golden redfish fishery occurred on the Flemish Cap bank from September 2005 onwards on shallower depths above 300m, basically pursued by Portuguese bottom trawl and Russia pelagic trawl. This new reality implied a revision of catch estimates, in order to split recent commercial catch from the major fleets on Div. 3M into golden and beaked redfish catches. In 2001-2003 the redfish by-catch in numbers from the Flemish Cap shrimp fishery was 78% of the total catch numbers, declining to 44% in 2004 and 15% in 2005. Catches in 2007 and 2008 were respectively of 6 700 t and 8 500 t following an increase of TAC from 5 000 t in 2007 to 8 500 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on catch-at-age data from 1989-2006 including by-catch information from the shrimp fishery.

There are three bottom trawl survey series providing biomass indices as well as length and age data for the Flemish Cap redfish stocks; Russia (1983-93, 1995-96 and 2001-2002), EU (1988-2008) and Canada (1979-85 and 1996). The Russian survey was complemented with an acoustic estimate of the redfish pelagic component for the 1988-92 period. Survey bottom biomass and female spawning biomass were calculated from 1988-2008 EU surveys. A virtual population (XSA) was carried out for 1989-2008. The assessment was consistent with the results of the 2005 and 2007 XSA's. Although the assessment was accepted it exhibits poor diagnostics and was not considered reliable for projections.

PRECAUTIONARY REFERENCE POINTS: No updated information on biological reference points is available.

STOCK STATUS: Scientific Council concluded that the stock biomass and spawning biomass are increasing. Nonetheless the spawning stock is currently still at a low level compared to the earlier period in the time series. At the low fishing mortalities of the most recent years and with growth of the relatively strong recent year-classes, spawning biomass should continue to increase.

RECENT MANAGEMENT ADVICE: Low fishing mortalities should be maintained so as to promote female spawning stock recovery. Scientific Council recommends that catch for all redfish in Div. 3M in 2010 and 2011 should not exceed 8 500 tons which is in the range of catches in recent years.

This stock will next be assessed in 2011.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.13. Redfish (*Sebastes spp.*) in Sub-area 1

Multi-year Advice for 2009-2011 was provided for this stock in 2008.

Denmark, on behalf of Greenland, requested the Scientific Council to: provide advice on the scientific basis for the management of Redfish (*Sebastes spp.*) and other finfish in Subarea 0+1 for 2009-2011.

There are two redfish species of commercial importance in Sub-area 1: golden redfish (*Sebastes marinus*) and deep-sea redfish (*Sebastes mentella*). These are very similar in appearance and are reported collectively as redfish in statistics. Their relationship to other north Atlantic redfish stocks is unclear.

FISHERIES: Historically, redfish were taken mainly as a by-catch in the trawl fisheries for cod and shrimp. However, occasionally during 1984-86, a directed fishery on redfish was observed for German and Japanese trawlers. With the collapse of the Greenland cod stock during the early-1990s, resulting in a termination of that fishery, catches of commercial sized redfish were taken inshore by long lining or jigging and offshore in shrimp fisheries only. Recent catch figures do not include the weight of substantial numbers of small redfish discarded by the trawl fisheries directed at shrimp.

In 1977, total reported catches peaked at 31,000 t. During the period 1978-83, reported catches of redfish varied between 6,000 t and 9,000 t. From 1984 to 1986, catches declined to an average level of 5,000 t due to a reduction of effort directed to cod by trawlers from EU-Germany. With the closure of the offshore fishery in 1987, catches decreased further to 1,200 t, and have remained at that low level. Redfish is mainly taken as by-catch by the offshore shrimp trawlers; reported bycatches in from 2004 to 2007 are 500 t per year. However, this must be considered an underestimation.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on EU-German groundfish surveys (1982-2007), Greenland-Japan and Greenland deep-sea surveys (1987-95 and 2000), and Greenland bottom trawl surveys (1988-2007).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock

STOCK STATUS: The stock of golden redfish (*S. marinus*) in Subarea 1 remains severely depleted, although some signs of rebuilding are observed.

The spawning stock of deep-sea redfish (*S. mentella*) in Subarea 1 remains severely depleted, and an increase is unlikely in the short term.

RECENT MANAGEMENT ADVICE: No directed fishery should occur on demersal redfish in Subarea 1 in 2009, 2010 and 2011. Bycatches in the shrimp trawl fishery should be kept at the lowest possible level.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.14. Redfish (*Sebastes spp.*) in Division 30

Multi-year Advice for 2008-2010 was provided for this stock in 2007.

There are two species of redfish that have been commercially fished in Div. 30; the deep sea redfish (*Sebastes mentella*) and the Acadian redfish (*Sebastes fasciatus*). These are very similar in appearance and are reported collectively as redfish in statistics. Most studies the Council has reviewed in the past have suggested a closer connection between Div. 3LN and Div. 30, for both species of redfish. However, differences observed in population dynamics between Div. 3LN and Div. 30 suggested that it would be prudent to keep Div. 30 as a separate management unit.

FISHERIES: Nominal catches have ranged between 3,000 and 35,000 tons since 1960. Up to 1986 catches averaged 13,000 tons then increased to 35,000 tons in 1988. From 2002-2003 catches averaged 17 200 tons then declined dramatically to about 3 800 tons in 2004. Catches in 2005 and 2006 were higher at about 11000 tons and 13 000 tons respectively. Total catch of redfish in 30 was estimated to be 5 200 t in 2007.

SOURCE OF MANAGEMENT ADVICE: Within Canada's fisheries jurisdiction redfish in Div. 30 have been under TAC regulation since 1974 and a minimum size limit of 22cm since 1995, whereas catch was only regulated by mesh size in the NRA of Div. 30. The Scientific Council was unable to advice on a TAC in 2003. In September 2004, the Fisheries Commission adopted TAC regulation for redfish in Div. 30, implementing a level of 20 000 tons per year for 2005-2007. This TAC applies to the entire area of Div. 30.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Surveys indicate the stock has remained stable since 2001 but at a lower level than the mid-1990s.

RECENT MANAGEMENT ADVICE: Catches have averaged about 13 000 tons since 1960 and over the long term, catches at this level appear to have been sustainable. The Scientific Council noted that over the period from 1960 to 2006, a period of 47 years, catches have surpassed 20 000 tons in only three years. The Scientific Council noted there is insufficient information on which to base predictions of annual yield potential for this resource. Stock dynamics and recruitment patterns are also poorly understood. Scientific Council is unable to advise on an appropriate TAC for redfish in Div. 3O in 2008, 2009 and 2010.

The next full assessment of this stock is planned to be in 2010.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.15. Roughhead grenadier (*Macrourus berglax*) in Sub-areas 2 and 3

Multi-year Advice for 2008-2010 was provided for this stock in 2007.

The NAFO Scientific Council reviewed the status of this stock (interim monitor) at this June 2008 meeting. Based on overall indices for the current year, Scientific Council found no significant change in the status of this stock. The next full assessment of this stock is planned to be in 2010.

Roughhead grenadier is distributed throughout Subareas 2 and 3 in depths between 300 and 2,000 m. This is not a regulated species.

FISHERIES: There is no directed fishery for roughhead grenadier and most of the catches are taken as bycatches in the Greenland halibut fishery in Subareas 2 and 3. Roughhead grenadier is taken mainly in Div. 3LMN Regulatory Area. From 1993 to 1997 the level of the catches was around 4 000 tons. The highest level of observed catches (7 231 tons) was reached in 1998. From then until 2004 catches were around 3 000 tons. In 2005 and 2006, catches declined further to 1500 tons. A total catch of 664 t was estimated for 2007.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on various bottom trawl surveys, which partially cover the distributional area of the roughhead grenadier population. Additionally, data on depth distribution and biological parameters are available. Because of limited time series, limited coverage and various vessel/gears conducting these surveys, the information is of limited value in determining resource status. It is not possible to provide an estimate of the absolute size of the stock.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for roughhead grenadier in Sub-areas 2 and 3.

STOCK STATUS: Current fishing mortality is the lowest of the available series and although the strong 2001 year-class seems to be weaker than expected, the assessment results showed that current estimates of biomass are the highest of the time series.

RECENT MANAGEMENT ADVICE: In 2007, an analytical assessment was presented but it was not accepted due to the uncertainty in the results. NAFO advised that it is not possible to provide any advice for roughhead grenadier in Sub-areas 2 and 3.

The next assessment will be held in 2010.

STECF COMMENTS: STECF has no comment.

12.16. Roundnose Grenadier (*Coryphaenoides rupestris*) in Sub-areas 0+1

Multi-year Advice for 2009-2011 was provided for this stock in 2008.

Denmark, on behalf of Greenland, requested the Scientific Council to: provide advice on the scientific basis for the management of Roundnose grenadier in Subarea 0+1 for 2009-2011.

FISHERIES: Recommended TACs were at 8,000 t over the period 1977-95. The advice since 1996 has been that the catches should be restricted to bycatches in fisheries targeting other species. There has been no directed fishery for this stock since 1978. An unknown proportion of the reported catches of roundnose grenadier are roughhead grenadier (*Macrourus beglax*).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on biomass estimates of roundnose grenadier from surveys in Div. 0B during the period 1986-92, from 1CD in 1997-2007 and Div. 0B in 2000-2001. No analytical assessment could be performed.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for roundnose grenadier in Sub-areas 0+1.

STOCK STATUS: The stock of roundnose grenadier is still at the very low level observed since 1993. The biomass of the stock component in SA 0+1 has been at a very low level since 1993 and the stock is composed of small individuals.

RECENT MANAGEMENT ADVICE: There should be no directed fishing for roundnose grenadier in Subareas 0 and 1 in 2009-2011. Catches should be restricted to bycatches in fisheries targeting other species.

STECF COMMENTS: STECF agrees with the advice from NAFO

12.17. Northern Shortfin Squid (*Illex illecebrosus*) in Subareas 3 and 4

STECF notes that a full assessment of Northern shortfin squid was requested by the NAFO Fisheries Commission. However, the expertise needed to complete this task was not available during the Scientific Council meetings since 2008.

Information on this stock is updated from NAFO Scientific Council Reports, 2008.

The northern short-finned squid (*Illex illecebrosus*) is an annual species (1-year life cycle) and is considered to comprise a unit stock throughout its range in the Northwest Atlantic Ocean, from Newfoundland to Florida including NAFO Sub-areas 3-6.

FISHERIES: Catches in Sub-areas 3+4 increased during the late-1970s, averaging 81,000 t during 1976-81, and peaking at 162,000 t in 1979. Catches in Sub-areas 3+4 declined to 100 t in 1986, ranged between 600 and 11,000 t during 1987-95, increased to 15,800 t in 1997. After 1997, catches ranged between 100 tons in 2001 and 2 300 tons in 2004. Catches in Subareas 3+4 in 2007 (230 t) was substantially lower than in 2006 (6 900 t).

A TAC for Sub-areas 3+4 was first established in 1975 at 25,000 t, but was increased in 1978, 1979 and 1980. The Sub-area 3+4 TAC remained at 150,000 tons during 1980-1998 and was set at 75,000 tons for 1999 and 34,000 tons for 2000-2007.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for short finned squid in Sub-areas 3+4.

STOCK STATUS: During 2006, indices of relative abundance and biomass were the fourth highest on record in the Div. 4VWX July survey. The values of the index in 2004 and 2006 were the highest two observed since the onset of the low productivity period beginning in 1982.

RECENT MANAGEMENT ADVICE: The Scientific Council's monitoring report indicates no significant change in the status of this stock and therefore Scientific Council advises that the TAC for 2009 be set between 19 000 and 34 000 t.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.18. Thorny Skate (*Amblyraja radiata*) in Divisions 3L, 3N and 3O and Subdivision 3Ps

Multi-year Advice for 2009-2010 was provided for this stock in 2008.

FISHERIES: Thorny skate in Div. 3LNO was previously treated as an assessment unit within NAFO. However, distribution dynamics and studies on biological characteristics suggest a single stock within Div. 3LNOPs. This report treats thorny skate within Div. 3LNOPs as the stock unit.

Commercial catches of skates comprise a mixture of skate species. However, thorny skate represents about 95% of the skates taken in the catches. Thus, the skate fishery on the Grand Banks can be considered as a directed fishery for thorny skate.

The main participants in this fishery are EU-Spain, Canada, Russia and EU-Portugal. Catches peaked at about 31,500 tons in 1991, and averaged 8 600 t from 1992-1995. Catch levels as estimated by STACFIS on Div. 3LNOs averaged 9 050 t during the period 2000-2007. This species came under quota regulation in 2004, when the Fisheries Commission set a TAC of 13 500 tons for 2005-2007 in Div. 3LNO and Canada set a TAC of 1 050 t for Subdiv. 3Ps.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The Canadian spring survey biomass indices fluctuated without trend prior to the mid-1980s then declined rapidly until the early-1990s. The biomass has been stable during the 1996 to 2004 period. During recent years the biomass appears to be increasing.

PRECAUTIONARY REFERENCE POINTS: Reference points are not available for thorny skate at this time.

STOCK STATUS: The current state of the stock is unclear compared to the historic (pre-1980s) period. The biomass has been relatively stable from 1996 to 2004 but at a lower level than in the mid-1980s. During 1995-2004, average catch as estimated by STACFIS was about 11 900 tons. Recent catches from 2005-2007 averaged 5 580 t during a period when biomass indices increased slightly.

RECENT MANAGEMENT ADVICE: To promote recovery of thorny skate, Scientific Council recommended that catches in 2009 and 2010 should not exceed 6 000 t (the average catch during the past three years) in NAFO Divisions 3LNOPs.

STECF COMMENTS: STECF agrees with the advice from NAFO

12.19. White hake (*Urophycis tenuis*) in Divisions 3N, 3O and Subdivision 3Ps.

Multi-year Advice for 2010-2011 was provided for this stock in 2009.

The stock area is defined by Scientific Council as Div. 3NOPs, and is mainly concentrated in southern Subdiv. 3Ps and on the southwestern Grand Bank. Scientific Council is asked to provide advice on the portion of the stock in Div. 3NO only.

FISHERIES: Catches in Div. 3NO peaked in 1985 at 8,100 tons, and then declined from 1988 to 1994 (2,090-ton average). Average catch was at its lowest between 1995 and 2001 (464 tons); then increased to 6,700 tons in 2002 and 4,800 tons in 2003. Total catch decreased to an average of 848 tons in 2006-2008. Catches of White Hake in Subdiv. 3Ps were at their highest in 1985-1993, averaging 1 114 tons, decreasing to an average of 668 tons in 1994-2003. Subsequently, catches in Subdiv. 3Ps have averaged 1 068 tons during the period 2006-2008.

SOURCE OF MANAGEMENT ADVICE: Length frequency data from the Canadian fishery (1994-2008), and from the catches of EU-Spain (2002, 2004), EU-Portugal (2003-2004, 2006-2008), and Russia (2000-2006) were available. Biomass and abundance indices were available from annual Canadian spring in Div. 3LNOPs (1972-2008), autumn in Div. 3LNO (1990-2008) bottom trawl surveys and Spanish spring surveys in the NAFO Regulatory Area of Div. 3NO (2001-2008).

PRECAUTIONARY REFERENCE POINTS: The Scientific Council was unable to define reference points for this stock.

STOCK STATUS: The biomass of this stock increased in 2000 with the large 1999 year-class. Subsequently, the biomass index has decreased and remains at levels comparable to the beginning of the Canadian Campelen time series in 1996-1998. **RECENT MANAGEMENT ADVICE:** Given the current level of recruitment, SC advises that catch of White Hake in Div. 3NO, at the current TAC (2009) of 8 500 tons, is unrealistic. Catches for 2010 and 2011 should not exceed their current levels of 850 tons in 3NO. Catches for 2010 and 2011 should not exceed their current levels of 1050 tons in subdivision 3Ps. The next assessment of this stock will be in 2011.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.20. Witch Flounder (*Glyptocephalus cynoglossus*) in Divisions 2J, 3K and 3L

Multi-year Advice for 2008-2010 was provided for this stock in 2007.

Historically, the stock occurred mainly in Div. 3K although recently the proportion of the stock in Div. 3L is greater. In the past, the stock had been fished mainly in winter and springtime on spawning concentrations but is now only a bycatch of other fisheries.

FISHERIES: During the late-1970s and early-1980s witch flounder were widely distributed around the fishing banks, primarily in Division 3K. During however, they were rapidly disappearing and by the early-1990s, had virtually disappeared from this area entirely; except from some very small catches along the continental slope in southern part of Division 3K. They now appear to be located only along the deep continental slope area, especially in Division 3L both inside and outside the Canadian 200-mile fishery zone. The catches during 1995-2004 ranged between 300 and 1 400 tons including unreported catches. The 2005 catch declined to 155 tons and the 2006 catch was only 84 tons. The catches in 2007 were 53 t, the lowest catch in the time series.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is Canada. NAFO Scientific Council has recently been asked to evaluate the status of the resource. The advice is based on abundance and biomass data from Canadian autumn surveys (1977-2007). Age based data have not been available since 1993, and none are anticipated in the near future. The last assessment of this stock was carried out in 2001 and no analytical assessment has been possible since then.

PRECAUTIONARY REFERENCE POINTS: In the absence of an analytical assessment, Blim was calculated as 15% of the highest observed biomass estimate (Blim = 9 800 tons). Since the highest observed biomass estimates are in the early part of the time series when the survey did not cover the entire stock area, Blim may be underestimated using this method. Nevertheless, the stock has been below this limit reference point since 1992.

STOCK STATUS: Based on the most recent data, it is considered that the overall stock remains at a very low level. Based on survey indices for the current year, there is nothing to indicate a change in the status of the stock.

The next full assessment of this stock is scheduled for 2010.

RECENT MANAGEMENT ADVICE: In 2007, NAFO advised that there should be no directed fishing on witch flounder in 2008, 2009 and 2010 in Div. 2J, 3KL to allow for stock rebuilding. Bycatches of witch flounder in fisheries targeting other species should be kept at the lowest possible level.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.21. Witch Flounder (*Glyptocephalus cynoglossus*) in Divisions 3N and 3O

Multi-year Advice for 2009-2011 was provided for this stock in 2008.

The stock mainly occurs in Div. 3O along the southwestern slopes of the Grand Bank. Traditionally, the fishery took place on spawning concentrations in the winter and spring.

FISHERIES: Catches exceeded the TAC by large margins during the mid-1980s. The catches from 1995-2002 ranged between 300-800 t including unreported catches. Catch for 2003 was estimated to be between 844 and 2 239 t. Catches in 2006 and 2007 were 481 t and 222 t respectively.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. The advice is based on converted abundance and biomass data from Canadian spring surveys during 1984-2007 and autumn surveys during 1990-2007. Biomass data is available from the Spanish Div. 3NO spring surveys during 1995-2001 in Pedreira units and 2001-2007 in Campelen units.

PRECAUTIONARY REFERENCE POINTS: The reference points for this stock are not determined.

STOCK STATUS: Stock remains at a low level.

RECENT MANAGEMENT ADVICE: No directed fishing on witch flounder in the years 2009, 2010 and 2011 in Div. 3N and 3O to allow for stock rebuilding. Bycatches in fisheries targeting other species should be kept at the lowest possible level.

STECF COMMENTS: STECF agrees with the advice from NAFO.

12.22. Yellowtail Flounder (*Limanda ferruginea*) in Divisions 3L, 3N and 3O

Information on this stock is updated from NAFO Scientific Council Reports, 2009.

FISHERIES: The stock is mainly concentrated on the southern Grand Bank and is recruited from the Southeast Shoal area nursery ground, where the juvenile and adult components overlap in their distribution.

There was a moratorium on directed fishing from 1994 to 1997, and small catches were taken as bycatch in other fisheries. The fishery was re-opened in 1998 and catches increased from 4 400 t in 1998 to 13 900 t in 2005. TACs were exceeded each year from 1985 to 1993, and 1998- 2001, but not since 2002. In 2006 and 2007 catches were much lower than the TACs. In 2008, catches increased to 11 400 tons, but remained lower than the TAC of 15 500 tons.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is NAFO. Abundance and biomass indices were available from: annual Canadian spring (1971-82; 1984-2008) and autumn (1990-2008) bottom trawl surveys; annual USSR/Russian spring surveys (1972-91); and Spanish surveys in the NAFO Regulatory Area of Div. 3NO (1995-2008). An analytical assessment using a stock production model was accepted to estimate stock status in 2009

PRECAUTIONARY REFERENCE POINTS: Scientific Council considered that 30% Bmsy is a suitable limit reference point (Blim) for this stock and that the limit reference point for fishing mortality (Flim) should be no higher than Fmsy. Currently the biomass is estimated to be above Blim and F, below Flim, so the stock is in the safe zone as defined in the NAFO Precautionary Approach Framework. **STOCK STATUS:** Stock size has steadily increased since 1994 and is currently estimated to be 1.6 times B_{MSY} .

RECENT MANAGEMENT ADVICE: Although biomass is well above Bmsy, Scientific Council does not consider it prudent to fish above 85% Fmsy because of the uncertainty in the estimation of Fmsy. Scientific The Council therefore recommends any TAC option up to 85% Fmsy for 2010 (25 500 t) and 2011 (23 500).

STECF COMMENTS: STECF agrees with the advice from NAFO.

13. Resources in the area of CECAF

STECF was unable to update the stock status and advice for some of the stocks in the area of CECAF. Consequently, the text for such stocks remains unchanged from the STECF Consolidated review of advice for 2009 (STECF, 2009)

Section 3 contains the most recent information for those stocks in the area of CECAF that are currently exploited by fleets from the EU. Formerly, information and advice on the status of resources in the region not exploited by EU fleets were also included in this section of the report.

The CECAF (Committee for the Eastern Central Atlantic Fisheries) region covers the FAO area 34, which extends from the Gibraltar Strait (36°N) down to the mouth of the Congo river (6°S) including the archipelagos of Madeira, the Canaries, Cape Vert and Sao Tomé e Príncipe. Recently, in 2006, Angola has joined the CECAF, broadening to the south the jurisdictional area of the organization down to the border with Namibia (around 18°S).

European fisheries in the CECAF region are conducted under fishing agreements between the European Union and most of the coastal countries. These agreements refer to a wide range of resources including crustaceans (shrimps, prawns and crabs), cephalopods (octopus, cuttlefish and squid), small pelagics (sardine, sardinellas, horse mackerels, mackerel and anchovy), demersal finfish (hakes, seabreams, groupers, croakers, etc.) and tuna fish. The latter group of resources is of the responsibility of the ICCAT (International Commission for the Conservation of the Atlantic Tuna) and assessments on the state of these stocks are presented in Section 14 of this report.

Fishing agreements have evolved along the time. In 1999, finished that negotiated with Morocco and subsequently two other important agreements such those of Angola and Senegal came also to an end in 2004 and 2006, respectively. The last fishing agreement with Guinea expired in December 2008. On the other hand, a

new fishing agreement was reached between the European Union and Mauritania in 2006 for a period of six years, reviewable every two years. The most recent fishing agreement between the European Union and Guinea Bissau was signed in 2007 for a period of four years, extendable for identical periods. Furthermore, in 2007 a new fisheries partnership agreement has been signed with Morocco, but it only allows for exploiting a limited number of finfish resources expressly prohibiting any catch of crustaceans or cephalopods. This section of the report refers to the state of the stocks currently exploited by European fleets in the CECAF region.

The most recent assessments and advice provided in this report are based on the results of the CECAF Working Group on the Assessment of Small Pelagics off Northwest Africa held in Nouakchott (Mauritania) from the 21 to the 30 April 2009, on those of the Working Group on demersal resources in the northern zone which met in Banjul (The Gambia) from 6 to 14 November 2007, and on those of the Working Group on demersal resources in the southern zone which met in Freetown (Sierra Leone) from the 8 to the 18 October 2008. The results from the assessments have not yet been formally published and therefore the information provided in Section 3 is to be regarded as preliminary and may be subject to change.

13.1. Sardine (*Sardina pilchardus*) off Morocco, Western Sahara (under Moroccan administration), Mauritania and Senegal

FISHERIES: Sardine is exploited along the Moroccan and the Western Sahara shelves in four different fishing grounds referred to as north stock (between 33°N and 36°N), central stock including zone A (between 29°N and 32°N) and zone B (between 26°N and 29°N), and southern stock or zone C (between 22°N and 26°N). Currently, zone north is exploited by a reduced number of small purse seiners from the north of Morocco. Fisheries for sardine in zones A and B are exclusively carried out by Moroccan boats. Those in zone C were fished by 10 Spanish purse seiners, based in Arrecife de Lanzarote (Canary Islands), during the last fishing agreement currently elapsed, and by an unknown number of Moroccan purse seiners and long distance trawlers from Russia, Ukraine, Norway, Netherlands, and other countries. The non-Moroccan vessels operate under bilateral or private fishing agreements.

The new fisheries partnership agreement between Morocco and the EU entered into force in 2007 permits vessels from Europe to fish for small pelagics, including sardine, using pelagic trawls in zone C. To date no boat has made a request for a licence under this provision.

In 2008 and 2007, the sardine catch from zone A was 32 000 and 11 000 tonnes respectively. Catch in this zone has seen some recovery since the sharp decrease in 1996. The specific composition of the sardine fleet landings in this zone has experienced a significant change over the last few years. Sardine, which was the predominant species in the catch, has declined, giving way to mackerel, which is essentially caught off the Bay of Agadir. The northern zone has decreased from around 13 000 and 11 000 tonnes. On the other hand, catch of sardine in Zone B has shown relative stability in 2007 (356 000 t), increasing from around 446 000 tonnes in 2008.

Moroccan Zone C registered a decrease in sardine catch from around 183 000 tonnes in 2007 and 162 000 t in 2008. This zone has been exploited by a heterogeneous fleet working within the framework of different access regimes. In addition to traditional coastal purse seiners and Moroccan RSW vessels, the fleets operating in this area also includes pelagic trawlers operating under a fishing agreement between Morocco and the Russian Federation and boats (purse seiners, RSW and freezer trawlers) chartered by Moroccan operators.

The sardine catch in the Mauritanian zone saw an increase, climbing from almost 73 000 tonnes in 2006 to a catch of 85 000 tonnes in 2007 and 75 000 tonnes in 2008. Catches are carried out on a seasonal basis by pelagic trawlers from the European Union (EU) and the Russian Federation.

Catch in the Senegalese zone was estimated at 12 000 tonnes in 2007 and 4 000 tonnes in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). Assessment Working Groups have traditionally considered that the sardine from zones A and B belong to a single stock named the central stock, and that those from zone C constituted a separate unit stock called the southern stock. The last FAO Working Group on the Assessment of Small Pelagics off Northwest Africa was held in Nouakchott (Mauritania) from the 21 to the 30 April 2009.

PRECAUTIONARY REFERENCE POINTS: Reference points were defined in the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa that was held in Banjul (Gambia) in 2006. B_{MSY} and F_{MSY} were adopted as Limit Reference Points, while $B_{0.1}$ and $F_{0.1}$ were chosen for Target Reference Points.

STOCK STATUS: The Schaefer logistical dynamic production model was used to assess the two stocks, A+B and C using the BioDyn model. Forecasting of catch abundance for the following five years was based on different management scenarios using the same model.

The results for Zone A+B showed that the estimated biomass in 2008 was slightly greater than $B_{0.1}$ and fishing mortality lower than $F_{0.1}$. The relationship $B_{cur}/B_{0.1}$ showed that the stock is currently considered fully exploited.

For Zone C, the results indicate that the estimated biomass in 2008 was greater than $B_{0.1}$ and the fishing mortality lower than $F_{0.1}$. Sardine in this C, does not show signs of over exploitation and the estimated biomass index from the regional survey (November–December) increased in 2007 as compared to 2006, followed by a decrease of 18% in 2008. Nevertheless, given the fluctuations observed in the abundance of this stock care should be taken in its management.

RECENT MANAGEMENT ADVICE:

Central stock: The situation for the Sardine stock in Zone A+B seems to have improved since 2006 and this stock is now considered fully exploited. As a precautionary measure, and taking into consideration the fluctuations observed in this stock, the working groups maintains the 2008 recommendation that catches should not exceed 400 000 tonnes.

Southern stock: The results of the model indicated that the stock is moderately exploited. The total catch level may be temporarily increased, but should be adjusted to natural changes in the stock. It was recommended that the stock structure and abundance should be closely monitored by fishery independent methods.

STECF COMMENTS: STECF has no comments

13.2. Anchovy (*Engraulis encrasicolus*) off Morocco and Mauritania

FISHERIES: Anchovy is exploited in the northern region of the Moroccan coast by purse seiners from Morocco. Catches in this region by purse seiners are mainly composed of anchovy, sardine (*Sardina pilchardus*) and mackerel (*Scomber japonicus*). The activity of Moroccan boats is unknown. In the region the anchovy is also fished in Mauritania. Anchovy is not the main target of the fishery in the area, but large quantities are caught as by-catch by industrial pelagic trawlers fishing for sardinella, horse mackerel or mackerel.

The fisheries partnership agreements between EU-Morocco and EU-Mauritania have allowed for fishing possibilities for purse seiners and pelagic trawlers, targeting anchovy in the northern zone of Morocco and in Mauritania respectively. Under the 2007 EU-Morocco agreement, a fleet of 11 boats from the south of Spain commenced fishing from June 2007. So far no data are available on this activity. No European pelagic trawlers have requested a licence to fish for anchovy in Mauritania.

Total anchovy catches in the region increased steadily between 1996 and 2003, increasing from 20,000 tonnes to around 180,000 tonnes. In 2004 and 2005 the total anchovy catch dropped by 46 percent compared to 2003. In 2006, catches saw an increase of nearly 43 percent with respect to 2005. Catch increased around 139 000 tonnes and 122 000 tonnes in 2007 and 2008, respectively. This increase was registered for the most part in Mauritania.

Since 1995, Mauritania's share of the total catch has increased steadily. It has risen from 8 percent of total anchovy catch in 1995 to 84 percent in 2008.

It should be noted that around 85 percent of total anchovy catch in the region is caught in Mauritania and that Russian and Ukrainian fleets, which account for about 70 percent of the Mauritanian total, play an important role. In 2006, the increase in catch by these fleets can be explained by the resolution of technical and financial problems of previous years. Recent integration into the European Union of countries such as Latvia (previously counted in the group of other industrial fisheries) has increased the catch of anchovy by the EU.

It is therefore possible to conclude that the increase in total anchovy catch in the region in 2006 can be explained partly by the high increase in European, Russian and Ukrainian effort in Mauritania, and, to a lesser extent, by that of the Moroccan fleet in zone B.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). Anchovy is assessed by the Working Group on the Assessment of Small Pelagics off Northwest Africa. This Working Group met in Nouakchott (Mauritania) from the 21 to the 30 April 2009.

PRECAUTIONARY REFERENCE POINTS: No reference points have been proposed for this stock.

STOCK STATUS: An exploratory LCA analysis was conducted in 2009 to identify the most targeted length classes in the Moroccan zone, and the Thompson and Bell model of catch by recruit was applied. Results showed the stock fully exploited.

A series of acoustic survey was carried out in 2008 by different vessels in the region. Estimates of anchovy biomass are summarised in the following table:

	Cap Spartel-Sidi Ifni R/V AL AMIR	Sidi Ifni-Cap Blanc R/V AL AMIR	Cap Cantin-Cap Blanc R/V AL AMIR	Cap Safi-St Louis ATLANTIDA	Mauritania R/V AL AWAM
Biomass estimates (tonnes)	102 000	178 000	105 000	0	24 000
Survey season	April	May-June	December	July-August	November

RECENT MANAGEMENT ADVICE: As a precautionary measure, it was recommended that the effort level should not exceed current level.

STECF COMMENTS: STECF has no comments

13.3. Black hake (*Merluccius senegalensis* and *Merluccius polli*) off Western Sahara (under Moroccan administration), Mauritania and Senegal

FISHERIES: The so-called black hake is a commercial category made of Senegalese hake (*Merluccius senegalensis*) and Benguela hake (*Merluccius polli*). These species tend to occur in waters off Western Sahara, Mauritania and Senegal where they are target of a specialized fleet of Spanish trawlers. A Spanish fleet of longliners also exploit them, but to a lesser extend. This fleet formerly operated on the shelf of all three countries, depending on the seasonal abundance of hake in the different areas. The interruption of the fishing agreements with Morocco and Senegal stopped this practice and for some time, the fishery was restricted to Mauritanian waters. Following the new (2007) agreement with Morocco, in 2007, fishing for black hake by Spanish fleets has extended to the Western Sahara (under Moroccan administration) and Mauritania.

The combined catch of black hake in the whole CECAF region varied between 7 253 t and 22 244 t over the period 1983-2006. Most of the catches of these species are made in Mauritania where they have observed a cyclical but general increasing trend from 1983 to 2001 when a maximum historic value of 16 104 t was attained. Since then, catches have experienced a sharp steady decline, reaching a minimum of 7 253 t in 2006. The Spanish trawler fleet accounted for almost 100% of the catches made between 1983 and 1991. In subsequent years other fleets started fishing for black hake in Mauritania and the importance of the Spanish trawlers catches decreased to an average of around 65% with minimums slightly higher than 50% in 2005 and 2006. Other important fleet components in this fishery are Mauritanian trawlers.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). *Merluccius senegalensis* and *Merluccius polli* are regularly assessed by the Working Group on demersal resources in the northern zone which last meeting was held in Banjul (The Gambia) from 6 to 14 November 2007.

PRECAUTIONARY REFERENCE POINTS: Reference points defined for small pelagics in the FAO Working Group held in Banjul (The Gambia) in 2006 were also adopted for the black hake stock. These are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points.

STOCK STATUS: The Schaefer logistical dynamic production model was used to assess the stock. For Mauritania, the current abundance of black hake is well below that required to produce maximum sustainable yield ($B_{cur}/B_{MSY} = 45\%$). Current fishing effort is 26% higher than that corresponding to $F_{0.1}$ but smaller than that allowing to keep the stock biomass at the current level ($F_{cur}/F_{SYcur} = 73\%$). These results clearly show that the stock is overexploited although there is a chance for recovery if no increase in fishing effort is allowed.

RECENT MANAGEMENT ADVICE: For the Mauritanian stock, it was recommended that fishing effort be reduced in order to allow better yields in the future. This recommendation should be applied both to the fleet that directly targets black hake and to fleets that target other demersal species, as these have large by-catches of black hake. Further recommendation is to keep catches at a maximum level of 7 000 t.

STECF COMMENTS: STECF has no comments.

13.4. Octopus (*Octopus vulgaris*) off Mauritania

FISHERIES: The cephalopod fishery in Mauritania started in 1965. Since then Japanese, Korean, Libyan, Spanish, Portuguese, Chinese and Mauritanian fleets have all exploited these resources. Currently, some 200 Mauritanian freezer trawlers, most of them re-flagged from other nationalities, and a substantial artisanal fleet of around 900 canoes fishing with pots (poulpiers), continue to fish the cephalopods in Mauritania. Since 1995 Spanish vessels have returned to the fishery after several decades of absence, with around 25 freezer trawlers currently involved in the fishery. Octopus (*Octopus vulgaris*) is the target species in this fishery followed in importance by cuttlefish (mainly *Sepia hierredda*), squid (*Loligo vulgaris*) and a miscellaneous group of many different finfish species.

Overall catches of octopus in the period 1990-2006 have ranged from a minimum of 17,400 t in 1998 and a maximum of 44,600 t in 1992. Production of Spanish trawlers has steadily increased from 1995 until 2000 when it peaked at a value of 12,265 t. Catches then decreased until 2003 (6402 t) and increased slightly in 2004 (7321 t) and 2005 (9306 t). In 2006, the Spanish catch of octopus was again smaller than in preceding years attaining a value of 6482 t. Catches of Mauritanian trawlers represent around 40% of the total production of octopus. The artisanal fleet fishing for octopus has very much evolved in recent years contributing around 22% to the total catch of the species in 2006.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). *Octopus vulgaris* is regularly assessed by the Working Group on demersal resources in the northern zone which met in Banjul (The Gambia) from 6 to 14 November 2007.

PRECAUTIONARY REFERENCE POINTS: Reference points defined for small pelagics in the FAO Working Group held in Banjul (Gambia) in 2006 were also adopted for the octopus stock. These are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points.

STOCK STATUS: The Schaefer dynamic production model was used to assess the stock. Results showed that current biomass is half of that producing the target biomass ($B_{cur}/B_{0.1} = 51\%$) and that fishing mortality is higher than that needed to reach the target $F_{0.1}$ ($F_{cur}/F_{0.1} = 143\%$). The Mauritanian octopus stock is therefore overexploited.

RECENT MANAGEMENT ADVICE: Taking into account the assessment results it was recommended a general reduction in fishing effort for all fleets involved in the fishery.

STECF COMMENTS: STECF has no comments.

13.5. Cuttlefish (*Sepia hierredda*) off Mauritania

FISHERIES: Cuttlefish species are taken as a by-catch in the same cephalopod fishery as octopus. The cuttlefish catch can be composed of several different species among which *Sepia hierredda* is the most abundant one. Production of that species in Mauritania has varied between 2373 t (2006) and 7722 t (1993) over the period 1984-2002. General trend of catches is decreasing with periodic maximums located in years 1993 (2373 t), 2001 (6555 t) and 2005 (4025 t). Most of these catches are taken by Mauritanian trawlers which contribute an average of more than 80% to the total production of the species.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). The cuttlefish is regularly assessed by the Working Group on demersal resources in the northern zone which met in Banjul (The Gambia) from 6 to 14 November 2007.

PRECAUTIONARY REFERENCE POINTS: Reference points adopted for this species are the same than those of most species in the region. These are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points.

STOCK STATUS: The Schaefer dynamic production model was applied to assess the stock. The fitting of the model to the available observed data was not satisfactory and the CECAF Working Group was unable to interpret the results. Nevertheless, abundance indices from annual research cruises conducted in Mauritania show a decreasing trend of cuttlefish biomass suggesting a state of overexploitation of the stock.

RECENT MANAGEMENT ADVICE: Taking into account the uncertainties surrounding the assessment results and the indications of progressive decline on biomass of the stock as from the research cruises, the CECAF Working Group decided to recommend a reduction in fishing effort.

STECF COMMENTS: STECF has no comments.

13.6. Coastal prawn (*Farfantepenaeus notialis*) off Mauritania

FISHERIES: The crustaceans of commercial importance in Mauritanian waters are exploited by a specialized fleet from Spain that targets different species among which are, in order of importance, the shrimp (*Parapenaeus longirostris*), the prawn (*Farfantepenaeus notialis*), the crab (*Chaceon maritae*) and the deep water shrimp (*Aristeus varidens*). Catches of *Farfantepenaeus notialis* made by these boats have varied between 405 t (1993) and 2 165 t (1999) over the period 1987-2006. Spanish catches in recent years show an increasing trend since 2003 (815 t) until 2006 (1 791 t). There are other fleet segments composed of freezer trawlers from Mauritania and from other foreign origins. Catches by Mauritanian freezer trawlers have increased from very low levels in 1992 (8 t) to a maximum of 807 t in 2002 followed by a more or less stable period with catches of around 700 t per year. Catches of other foreign freezer trawlers are much more fluctuating ranging from 31 t in 1996 to 929 t in 2005.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF) and *Farfantepenaeus notialis* is assessed by the Working Group on demersal resources in the northern zone which met in Banjul (The Gambia) from 6 to 14 November 2007.

PRECAUTIONARY REFERENCE POINTS: Reference points adopted for this species are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points.

STOCK STATUS: The Schaefer dynamic production model was applied to assess the stock. The fitting of the model is rather good indicating that the Mauritanian stock of *Farfantepenaeus notialis* appears to be fully exploited. The current biomass is very close to the target biomass $B_{0.1}$.

RECENT MANAGEMENT ADVICE: It was recommended to reduce fishing effort from the level observed in 2006.

STECF COMMENTS: STECF has no comments.

13.7. Deepwater shrimp (*Parapenaeus longirostris*) off Mauritania

FISHERIES: This species is fished in the same fishery than that of *Farfantepenaeus notialis*. *Parapenaeus longirostris* is the main target species in the fishery accounting for more than 50% to the total production. Total catches of this species have ranged from 497 t to 4269 t between years 1987 and 2006. On average, the Spanish freezer trawler fleet accounts for more than 80% of the catches.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF) and *Parapenaeus longirostris* is assessed by the Working Group on demersal resources in the northern zone, which met in Banjul (The Gambia) from 6 to 14 November 2007.

PRECAUTIONARY REFERENCE POINTS: Reference points adopted for this species are B_{MSY} and F_{MSY} for Limit Reference Points and $B_{0.1}$ and $F_{0.1}$ for Target Reference Points.

STOCK STATUS: The Schaefer dynamic production model was applied to assess the stock. In Mauritania the stock appears to be fully exploited. The biomass is close to $B_{0.1}$ and the fishing mortality in 2006 is also close to the target reference point.

RECENT MANAGEMENT ADVICE: The CECAF Working Group recommended no increase in fishing effort.

STECF COMMENTS: STECF has no comments.

13.8. Atlantic horse mackerel (*Trachurus trachurus*) and Cunene horse mackerel (*Trachurus trecae*) off Mauritania and other countries in the northern CECAF region.

FISHERIES: Under the framework of the new fishing agreement with Mauritania, the number of European vessels authorised to fish for small pelagics at the same time is fixed at 22 units. With respect to the previous agreement (2001–2006), where the number of vessels was fixed at 15, this is an important increase. A ceiling of 440 000 tonnes per year has been placed on total authorised catches, covering all species (sardinellas, horse mackerel, etc.). The current agreement includes new member states of the EU (Baltic States, Cyprus), which were already present in the Mauritanian zone. These fleets generally target horse mackerel.

The Atlantic horse mackerel is distributed off Western Sahara (under Moroccan administration) and Mauritania, while the cunene horse mackerel is mainly found in Mauritanian and Senegalese waters. The limit of the distribution of these stocks is subject to long-term variations. This greatly influences the catch of these species in Mauritania. Exploitation of horse mackerel is carried out by vessels of varying size, from the local artisanal canoes to the large pelagic trawlers.

The two horse mackerel species (*Trachurus trachurus* and *Trachurus trecae*) occupy neighbouring ecological niches and represented almost 94 percent of the total horse mackerel catch in 2007 and 2008. *Trachurus trachurus* is mainly fished to the north of Cape Blanc and *Trachurus trecae* to the south. The artisanal fishery catches account for only a small proportion of the overall catch, in the order of 1.3 percent in 2007 and 2.4 percent in 2008.

Even though total catches of the two horse mackerel species together have increased successively over the period 2003–2005 (from around 165 000 t to 393 000 t), in 2006 landings decreased by 5 percent, reaching a maximum of 407 000 t and 462 000 t in 2007 and 2008, respectively.

The cunene horse mackerel (*Trachurus trecae*) is the most important species. Catches of this species decreased from 270 000 tonnes in 2005 to around 250 000 tonnes in 2006. They increased again in 2007 and 2008 to around 307 000 t and 358 000 tonnes, respectively. The majority of the catch of this species is taken in the Mauritanian zone (82–85 percent). Catches of the Atlantic horse mackerel (*Trachurus trachurus*) were around 104 000 tonnes in 2008 whereas catches of false scad (*Caranx rhonchus*) were 31 000 tonnes for the same year.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). *Trachurus trachurus* and *Trachurus trecae* are assessed by the Working Group on the Assessment of Small Pelagics off Northwest Africa. This Working Group met in Nouakchott (Mauritania) from the 21 to the 30 April 2009.

PRECAUTIONARY REFERENCE POINTS: Reference points were defined in the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa that was held in Banjul (Gambia) in 2006. The indices B_{MSY} and F_{MSY} were adopted as Limit Reference Points, while the indices $B_{0.1}$ and $F_{0.1}$ were chosen for Target Reference Points.

STOCK STATUS: Stock assessment of the two horse mackerel species was carried out using a surplus production model.

Regarding *Trachurus trachurus* the application of the model used the abundance index series from regional acoustic surveys. The results showed that the estimated biomass in 2008 was slightly lower than $B_{0.1}$ and the fishing mortality was greater (13%) than $F_{0.1}$. The relationship $B_{cur}/B_{0.1}$ showed that the stock is currently considered fully exploited. The state of the stock of Atlantic horse mackerel (*T. trachurus*) seems to have improved in 2008, due probably to a good recruitment in 2007.

For *Trachurus trecae* global CPUE was used to fit the model. Results indicated that the 2008 biomass was in the middle of $B_{0.1}$ and fishing effort was greater than optimum effort. The stock was found to be over exploited, and

the recruitment survey index suggested a bad recruitment for 2008 compared with 2007. In addition a change of exploitation pattern has occurred with higher catches of smaller fish in 2008.

RECENT MANAGEMENT ADVICE: As a precautionary measure and because of the mixed horse mackerel fishery, it is recommended to decrease effort by 20%. The 2009 total catches of the two species combined should not exceed the mean of (2003-2007) 330 000 tonnes.

STECF COMMENTS: STECF has no comments.

13.9. Mackerel (*Scomber japonicus*) off Mauritania and other countries in the northern CECAF region.

FISHERIES: Two chub mackerel stocks have been identified in the Northwest Africa region. The northern stock is found between Cape Bojador (Western Sahara under Moroccan administration) and the north of Morocco, and the southern stock is situated between Cape Bojador and the south of Senegal.

In the northern zone (Tangiers–Cape Bojador), the chub mackerel fishery is exploited solely by the Moroccan fleet. This fleet is composed of coastal purse seiners, which mainly target sardine but also chub mackerel depending on availability. The zone between Cape Bojador and Cape Blanc is exploited, in addition to the Moroccan coastal purse seiners, by pelagic trawlers operating under the Morocco–Russian Federation fishing agreement, and by vessels chartered by Moroccan operators. In the zone to the south of Cape Blanc, several pelagic trawlers from different countries (Russian Federation, Ukraine, European Union and others) operate, but only targeting chub mackerel seasonally. In Senegal and The Gambia, chub mackerel is considered as by-catch by the Senegalese artisanal fleet.

Since 1991, total chub mackerel catch over the whole region has shown an increasing trend, reaching a maximum of more than 262 000 tonnes in 2008. To the south of Cape Blanc where the European fleet operates, total chub mackerel catch increased over the period 1990–1996, reaching around 100 000 tonnes. It then decreased to reach the low level of around 20 000 tonnes in 1999. Catch then progressively increased until 2003 when a record of 133 000 tonnes was recorded. Since then catches have heavily declined with 38 000 tonnes recorded in 2005 and 33 000 tonnes in 2006, reaching around 80 000 t and 60 000 t in 2007 and 2008, respectively.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). *Scomber japonicus* is assessed by the Working Group on the Assessment of Small Pelagics off Northwest Africa. This Working Group met in Nouakchott (Mauritania) from the 21 to the 30 April 2009.

PRECAUTIONARY REFERENCE POINTS: Reference points were defined in the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa that was held in Banjul (Gambia) in 2006. The indices B_{MSY} and F_{MSY} were adopted as Limit Reference Points, while the indices $B_{0.1}$ and $F_{0.1}$ were chosen for Target Reference Points.

STOCK STATUS: Assessments were carried out by applying a Schaefer dynamic surplus production model and ICA. Results showed the stocks fully exploited.

RECENT MANAGEMENT ADVICE: It was recommended, as a precautionary measure, that catches do not exceed the 2006 level of 200 000 tonnes.

STECF COMMENTS: STECF has no comment.

13.10. Sardinella (*Sardinella aurita* and *Sardinella maderensis*) off Mauritania and other countries in the northern CECAF region.

FISHERIES: Two species of sardinella (*Sardinella aurita* and *Sardinella maderensis*) occur in the region. The greatest exploitation of sardinella takes place in Mauritania and Senegal. This is carried out by the industrial fishery in Mauritania (EU and Russian fleets and a fleet of other vessels from Eastern Europe) and by the artisanal fishery in Senegal, most notably purse seines and the surrounding gillnets.

Total catches of *S. aurita* in the region have varied between 162 000 t (1994) and 563 000 t (2008) in the period from 1990 to 2008. For *Sardinella maderensis*, the catches show a long term increasing trend from 1997 (113 000 t) to 2003 (190 000 t). From 2003 catches decreased to a level of 118 000 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). *Sardinella aurita* and *Sardinella maderensis* are assessed by the Working Group on the Assessment of Small Pelagics off Northwest Africa. This Working Group met in Nouakchott (Mauritania) from the 21 to the 30 April 2009.

PRECAUTIONARY REFERENCE POINTS: Reference points were defined in the FAO Working Group on the Assessment of Small Pelagics off Northwest Africa that was held in Banjul (Gambia) in 2006. The indices B_{MSY} and F_{MSY} were adopted as Limit Reference Points, while the indices $B_{0.1}$ and $F_{0.1}$ were chosen for Target Reference Points.

STOCK STATUS: The stocks of sardinella were assessed by applying the Schaefer dynamic surplus production models. The total catches of the two sardinellas by the different fleets operating in the region and the abundance indices of the coordinated regional acoustic surveys were used for the assessment of the stocks of *S. aurita* and *Sardinella* spp.

There have been significant fluctuations in the indices of abundance of *Sardinella aurita* for the past six years. While the region saw significantly increased catches of the species in Mauritania and Senegal in 2007 and 2008 respectively, the tendency since 1999 to 2007 was a decreasing biomass from 2 134 000 tonnes to 912 000 tonnes before attaining the second largest abundance in the series in 2008. From the output of the model, the Working Group concluded that the stock was at a level below the one producing maximum sustainable yield. The total catches of this species in the region in 2008 were more than twice as large as the estimated natural production from the stock, indicating that fishing mortality largely exceeded the sustainable level.

The combined species (*Sardinella* spp.) showed significant oscillations in indices of abundance for most part of the series but tapered down to almost stability in the last two years due to the sharp opposing trends observed in the *S. aurita* and *S. maderensis* biomass series in 2008. The same trends are true for catches of the two species but an attempt to fit the model produced unreliable results due to large variability in observed abundance indices in 2004 (4 046 000 tonnes) and 2005 (2 030 000 tonnes) which could not be explained. The results of *S. maderensis* were not reliable.

RECENT MANAGEMENT ADVICE: The catches of round sardinella (*Sardinella aurita*) are high from the last 3 years probably associated with a very good recruitment in 2005, but there is currently no evidence of another good year class since then. For this reason the Working Group continues to be concerned about this stock and still considers it as overexploited.

Given the overexploitation of round sardinella, it was strongly recommended that catches and effort of *Sardinella* spp. should be decreased.

STECF COMMENTS: STECF has no comments.

13.11. Other demersal finfish in Mauritanian waters

FISHERIES: This group is composed of around 100 different species that can be taken either in targeted fisheries or as by-catch in other fisheries. The targeted fishery is conducted by an unknown number of small canoes that operate from many different places in the coast using a variety of artisanal gears. Other fisheries take these species as a by-catch and only retain onboard those that have any commercial interest, the remainder being discarded. The magnitude of the catches of most of these species in Mauritania is unknown. Nevertheless, the CECAF Working Group on demersal resources in the northern zone was able to estimate annual series of production from four seabreams (family Sparidae): *Pagellus bellottii*, *Pagellus acarne*, *Dentex macrophthalmus* and *Sparus caeruleostictus*, and one grouper (family Serranidae): *Epinephelus aeneus*.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the FAO Committee for the Eastern Central Atlantic Fisheries (CECAF). Demersal finfish are assessed by the Working Group on demersal resources in the northern zone, which met in Banjul (The Gambia) from 6 to 14 November 2007.

PRECAUTIONARY REFERENCE POINTS: Reference points adopted for these species are: B_{MSY} and F_{MSY} as Limit Reference Points, and $B_{0.1}$ and $F_{0.1}$ as Target Reference Points.

STOCK STATUS: Assessments conducted by application of dynamic surplus production models and abundance indices derived from research surveys concluded that all the four seabream stocks are overexploited and that the grouper stock is close to depletion.

RECENT MANAGEMENT ADVICE: To avoid any increase in fishing mortality while more precise assessments are made available.

STECF COMMENTS: STECF has no comments.

13.12. Deepwater shrimps off Guinea Bissau

FISHERIES: Crustacean resources in Guinea Bissau are mainly made of shrimps (*Parapenaeus longirostris* and *Aristeus varidens*), prawn (*Farfantepenaeus notialis*) and crab (*Chaceon maritae*). These species are exploited in a fishery conducted by Spanish trawlers and many other foreign fleets. Total catches of crustaceans in the period 1987-1996 have fluctuated between 378 t and 1943 t. In the last CECAF Working Group only Spanish fishery data were provided. Spanish catches of *P. longirostris* oscillated between 39 t (1998) and 662 t (2005) in the period after the civil war in Guinea Bissau (1998-2007).

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last published report of CECAF assessment working group on demersal resources, including crustaceans, was in 2003 (FAO/CECAF, 2006). In 1989, 1990, 1991 and 1995 IPIMAR conducted trawl surveys in a rectangle close to the Bijago's archipelago. Biomass estimates for the prospected area in 1989, 1990, 1991 and 1995 were respectively 12.9 t, 18 t, 42.5 t and 29.7 t for *Parapenaeus longirostris*, and 7.2 t, 9.7 t, 55.3 t and 14.8 t for *Farfantepenaeus notialis*. In October 2008, the Spanish Institute of Oceanography (Instituto Español de Oceanografía, IEO) carried out a trawl survey in the EEZ of Guinea Bissau. Biomass estimates in this survey were 107 t for *P. longirostris*, 52 t for *A. varidens*, 17 t for *C. maritae* and 25 t for *F. notialis* (García-Isarch *et.al.*, 2009). For this last species, it has to be considered that the prospected area was in waters deeper than 50 m, while the prawn main distribution zone is located in shallower areas. The last assessment Working Group on demersal resources from the southern area of the CECAF region was held in Freetown (Sierra Leona) in 2008, but results are still unpublished.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: Not available.

STECF COMMENTS: STECF has no comments.

13.13. Deepwater shrimps off Guinea Conakry

FISHERIES: The deepwater shrimp fishery in Guinea Conakry is mainly carried out by the Spanish shrimp trawlers fleet since 1995. The target species of this fleet is the shrimp *P. longirostris*, which constitutes almost the 60% of the catches. During the period 1995-2005, catches oscillated between 1 t in 1997 and 340 t in 1998.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last published report of CECAF assessment Working Group on demersal resources, including crustaceans, was in 2003 (FAO/CECAF, 2006). The last assessment Working Group on demersal resources from the southern area of the CECAF region was held in Freetown (Sierra Leona) in 2008, but results are still unpublished.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: Not available.

STECF COMMENTS: STECF has no comments.

13.14. Cuttlefish (*Sepia hierredda*) off Guinea Conakry

FISHERIES: In Guinea Conakry, cephalopods are targeted by industrial and artisanal fisheries. The industrial fishery is mostly conducted by Spanish freezer trawlers that started their activities in the area in 1986. In 1990 there were 27 units fishing for cephalopods but the number has decreased in successive years with only one vessel in 1994 and varied between one and four until 2001. The target species in this fishery is the cuttlefish (*Sepia hierredda*), with a by-catch of octopus (approximately 8% of the total catch). Reported catches of octopus have varied between less than a ton and 576 t during 1986-1996. Catches of the cuttlefish (*Sepia hierredda*) made by all fleets are in the order of an average of 6 000 t in the period 1995-2001.

SOURCE OF MANAGEMENT ADVICE: CECAF is the advisory body for this area. The last CECAF assessment Working Group on cephalopods was held in Cotonou (Benin) in 2005 but results are still unpublished.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for cuttlefish in Guinea Conakry.

STOCK STATUS: Assessments were carried out using dynamic production models. Results of fitting the model were not satisfactory due to an extremely high catch in 1996. Removing this catch from the data series the model showed that the stock was overexploited.

RECENT MANAGEMENT ADVICE: Taking into account the results of the assessments and the uncertainties attached to the analyses the CECAF Working Group recommended a reduction in fishing effort.

STECF COMMENTS: STECF has no comments

14. Resources in the area of WECAF

14.1. Shrimp (*Penaeus subtilis*), French Guyana

No new information was made available on the resource status or management advice for shrimp in French Guyana in 2009.

FISHERIES: Shrimp in the French Guyana EEZ, are now exclusively taken by French shrimp trawlers. Over the historical time period of the fishery (1968-1999), catches have fluctuated between 1 500 t and 5 600 t. The high variations in catches are mainly the result of changes in fleet composition and activity (USA and Japanese fleets in the early period, and the French fleet latterly), and economical and social problems (strikes). Over recent years, landings have been stable (about 3 800 t). The assessment area includes the French Guyana EEZ.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the IFREMER Centre in Cayenne. The assessment is based on LPUE (Landings per Unit Effort), production model, and catch-at-length analysis (cohort analysis).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The LPUE's series of the shrimp fleet shows seasonal trends, fluctuating around 200 kg/day. Over the period 1990-1999 there was a strong increase in average yield per day, probably due to a change fishing strategy as the fleet re-directed effort towards smallest individuals in shallower waters. Production modelling indicates an increase in the stock biomass over the last few years, coincident with a decrease in fishing effort since the early 1980's. The average biomass over 1996-1999 has been estimated at about 10 000 t, close to 2/3 of the estimated virgin biomass of 15 000 t -16,000 t. The estimated catch at 90% of MSY is close to 4 000 t, which is consistent with the present TAC of 4 108 metric tons established for the fishery.

Estimated LPUE at 90% of MSY is around 250 kg per fishing day, close to the actual catch rates in the fishery. LPUE is directly affected by the level of recruitment. Cohort analysis shows that statistically, there is no relationship between effort and fishing mortality.

RECENT MANAGEMENT ADVICE: The stock is considered to be fully exploited. A precautionary multi-annual (5 years period) TAC of 4 108 metric tons was decided by the European Community.

STECF COMMENTS: STECF agrees with the advice given by IFREMER

15. Resources in the southeast Atlantic (SEAFO)

15.1. Orange roughy (*Hoplostethus atlanticus*), SEAFO CA

FISHERIES: the current status of the fishery is unknown.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the SEAFO. Precautionary approach.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: Zero catch limit for orange roughy in Sub-Division B1 for 2010 and 2011. Catch limit of 50 t in the remaining area.

STECF COMMENTS: STECF notes that the data available for assessment of this stock are inadequate.

15.2. Patagonian toothfish (*Dissostichus eleginoides*), SEAFO CA

FISHERIES: The fishery is localized in Division D, between 40°S and 50°S. Three fishing grounds are in the area: Meteor Seamounts (Sub-Division D1), Discovery Seamounts (closed area) and western part of Division D seamounts. The fishery takes place as part of vessels' trips between fishing grounds on the Patagonian slope, CCAMLR fishing grounds and the Indian Ocean and a maximum of four vessels have participated in the fishery in any one year. Catches in 2008 were 160 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the SEAFO. SEAFO decided to use the CCAMLR catch limit in Subarea 48.6 (north 60°S) adjacent to SEAFO Division D.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: Catch limit of 200 t in the whole area.

STECF COMMENTS: STECF notes that the data available for assessment of this stock are inadequate.

15.3. Alfonsino (*Beryx spp.*), SEAFO CA

FISHERIES: the current status of the fishery is unknown.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the SEAFO.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: Catch limit of 200 t in the whole area.

STECF COMMENTS: STECF notes that the data available for assessment of this stock are inadequate.

15.4. Deep-sea red crab (*Chaceon* spp.), SEAFO CA

FISHERIES: The fishery is mainly located at Valdivia Bank (Sub-Division B1) and the main targeted species is *Chaceon erythrae* although others *chaceon* species are also distributed in the SEAFO CA. The fishery usually takes place during approximately three months per year and is carried out by one or two vessels. Landings in 2009 were 170 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the SEAFO. The assessment is based on catch level in 2005 and 2006.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The status of the stock is unknown.

RECENT MANAGEMENT ADVICE: Catch limit of 200 t in Sub-Division B1 and 200 t in the remainder of the SEAFO CA area.

STECF COMMENTS: STECF notes that the data available for assessment of this stock are inadequate.

16. Resources in the South-west Atlantic

Section 6 contains updated reviews of advice for stocks in Falkland Islands' waters, as well as first results of stocks status on the High Seas of the SW Atlantic from two research cruises carried out by IEO in March-April 2008 and March 2009. Landings information for Argentinean fleets is also included.

In October 2007, the Instituto Español de Oceanografía (IEO, Spanish Institute of Oceanography) started a series of five research cruises on the High Seas of the SW Atlantic on board the Spanish R/V Miguel Oliver, with the aim of studying Vulnerable Marine Ecosystems (VMEs) in the area between coastal states' EEZs and the 1500 m depth contour. The last of these 5 cruises, which ended in mid-April 2008, has a primary aim of initiating a time series of research vessel survey data for use in resource assessments. A further series of six campaigns in the same zone, with the same objectives, i.e. study of VMEs, cartography, benthos, geomorphology, sediment and stock assessment, started on the 16th October 2008 and finished the 1st April 2009. The last campaign of this series, conducted between the 24th February and the 1st April 2009, was the second cruise of 2008 time series aimed at providing data for assessments of the main commercial fishery resources on the High Seas of the Southwest Atlantic. To date, the swept area biomass estimates for each of the commercially exploited resources in international waters of the Southwest Atlantic are the only estimates available. Comparative results of the two surveys are therefore reported in the appropriate stock sections. The objective of the research surveys is to present a report on the location and features of candidate VMEs in the area, identifying any potential interactions with fishing activities. The report, which will be presented to the United Nations General Assembly (UNGA) before the end of December 2009, will include a map with a proposal for Marine Protected Areas (MPAs) in international waters of the Southwest Atlantic, as well as several management recommendations on reducing the impact of fishing activities on VMEs

16.1. Patagonian hoki (*Macruronus magellanicus*), Falkland Islands

FISHERIES: Hoki is mainly caught in the western part of the Falkland Islands Interim Conservation and Management Zone (FICZ) and is targeted mainly by various European and Falkland Islands registered finfish trawlers, but also forms a bycatch in the *Loligo* fishery and by surimi vessels. Catches increased from about 10,000 t in early 1990s when they were mainly taken as a bycatch to between 16,670-26,970 t since 1998 by a targeted trawl fishery.

The lowest catch in recent years was obtained in 2005. Catches subsequently increased for 2006-2008. The total catch in January – September 2009 was 18,113 t, just below the so far recorded highest catch in 2002. Hoki is mainly targeted in two seasons, from February-May and from July-October.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for providing management advice to the Falkland Islands Government.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: The stock is considered to be in good condition at present, however, historically, catches of hoki were quite variable and there is some concern that the current high catches may not be sustainable in the long term. Catches from 2005 to September 2007 have tended to be lower than catches in the previous years (2002-2004) and exploitation in the current year is similar to that of 2002. The reduction in recent catches is likely to have been a result of effort being diverted to the fishery for hake. The stock assessment for hoki in Falkland Islands' waters is problematic because of its migratory behaviour and only a small percentage of the stock is caught in the FICZ.

RECENT MANAGEMENT ADVICE: The advice is to hold the overall level of fishing effort in the Falkland Zone constant.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organisation.

16.2. Patagonian grenadier (*Macrourus carinatus*, *Macrourus holotrachys*), Falkland Islands

FISHERIES: *Macrourus holotrachys* (Günther, 1878) and *M. carinatus* (Günther, 1878) are two species, inhabiting deep seas of the Southwest Atlantic. *M. carinatus* is known to be distributed on the slopes of South America and other areas between 300 and 1100 m. *M. holotrachys* occurs around South America, Falkland Islands and Shag Rocks between 150 and 1750 m depth. In Falkland Islands' waters both species are taken as a bycatch in the longline fishery targeting Patagonian toothfish (*Dissostichus eleginoides*) at depths of 650–2000 m and occasionally by trawlers at 300–350 m depth. In 2007, grenadiers were taken as a bycatch by longliners and trawlers throughout the year. Total longline bycatch was 67 tonnes, while the trawlers took 162 tonnes of fish. Dense commercial aggregations of *Macrourus carinatus* (CPUEs >15 tonnes per day) were revealed on the southern Falkland slope, mostly between 700 and 900 m.

SOURCE OF MANAGEMENT ADVICE: Falkland Island Fisheries Department (FIFD) with advice from the Renewable Resources Assessment Group (RRAG), Imperial College, together with input from the South Atlantic Fisheries Commission (SAFC).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: RECENT MANAGEMENT ADVICE: Fishing effort in Falkland Zones is being held constant.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organisation.

16.3. Southern blue-whiting (*Micromesistius australis*), Falkland Islands

FISHERIES: Since 1992 Southern blue-whiting (SBW) has been mainly targeted by surimi vessels in Falkland Islands' waters. The targeted fishery mainly occurs in the Southwest of the Falkland Island Interim Conservation and Management Zone (FICZ). Southern blue whiting is also taken as an occasional by-catch by finfish trawlers.

In 2005-2006, surimi vessels have been operating only in the austral summer between October and March. Since 2007 the surimi vessels started to operate in the beginning of October and carried on until the beginning of December. During this period, vessels fished for aggregations of post-spawning fish, which were still feeding in the Falkland waters before dispersing further south.

The total catch between January – September 2009 was only 3,881 t, which was even lower than in 2008 (4,304 t), and much lower than in 2007 (9,872 t) and in 2006 (7,846 t).

SOURCE OF MANAGEMENT ADVICE: The management body is the Falkland Islands Fisheries Department (FIFD) together with advice from the Renewable Resources Assessment Group (RRAG), Imperial College.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been set for this stock.

STOCK STATUS: Both independent stock assessments of Southern blue whiting in the Southwest Atlantic performed by FIFD and RRAG in June 2009 suggested that the spawning stock biomass (SSB) decreased strongly since the early 90's (1,500,000 t) and reached a level of ~398,000 t at the end of 2008. This is approximately 26% of the spawning stock biomass in the early 1990s.

RECENT MANAGEMENT ADVICE: The total catch of Southern blue whiting should be limited to 50,000 t in the Southwest Atlantic. It was agreed to restrict the total catch of *Micromesistius australis* in the Falkland Islands' Conservation Zones to 25,000 t or maybe even lower.

Fishing in the southern region of FICZ in the spawning grounds was banned for surimi vessels from 1 August until 15 October 2009 to allow the fish to spawn undisturbed.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization.

STECF also notes that the advised TAC is well in excess of the recent reported catch levels and that recent SSB estimates are 26% of those estimated for the early 1990s.

16.4. Red cod (*Salilota australis*), Falkland Islands

FISHERIES: Red cod is fished in the western part of the FICZ mainly as a by-catch of the hoki and hake fisheries. Additionally, Spanish trawlers target red cod in spring (September-October) on their spawning grounds to the southwest of the Islands. Catches of red cod decreased from 4,649 – 9,313 t in 1996-2000 to between 2,285-2,781 t in 2003-2005. In 2006, the annual catch increased to 3,469 t, with the further increasing trend in 2007 (5,195 t). This then decreased to 4074 t in 2008. The total catch in January – September 2009 (3792 t) was higher than for the same period in 2008 due to an increased fishing effort.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government and has carried out stock assessments in 2008 and in 2009.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: The stocks have had a decreasing trend in their abundance due to fishing pressure on spawning aggregations during October. Stock assessments conducted in 2008 and 2009 indicate that SSB is at 26% of virgin stock size (SSB₀).

RECENT MANAGEMENT ADVICE: The Falkland proposal has been made to ban fishing red cod in their spawning grounds in October to allow the stock to recover.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization.

16.5. Argentine hake, Austral hake (*Merluccius hubbsi*, *Merluccius australis*), Falkland Islands

FISHERIES: Hakes are mainly caught in the western part of the FICZ. They are targeted by Spanish and Falkland Islands' registered trawlers having a special license for unrestricted finfish. The total catch of hakes in FICZ/FOCZ (Falkland Islands Interim/Outer Conservation Zone) decreased from 12,000 t in 1990 to 1,500 t in 1994-1997, and then stabilised at the level of 1,678-3,069 t in 2000-2005. Common hake (*M. hubbsi*) are targeted mainly in winter during their migrations to the Falkland waters from the Patagonian shelf. Austral hake (*M. australis*) are targeted almost exclusively in the southwest of the Islands in September-November after their spawning in the area around the Southern tip of South America. Catches of hakes have remained at a high level for the last three years, peaking at about 12,000 t in 2007. This year, catches from January-September (11,407 t) are highly similar to those from 2007 (11,641 t).

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Government is responsible for management of hake resources.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for this stock.

STOCK STATUS: The stock of common hake in the FICZ is a ‘shared’ stock with Argentina with only a small proportion of the stock occurring in Falkland Zones. The stock was in poor condition in 1991-1999. After strong recruitments in 2001-2002, juvenile abundance increased 5-10 times compared to the period 1996-2000 giving rise to exceptional catches of hakes in the last three years.

RECENT MANAGEMENT ADVICE: Fishing effort in Falkland Zones for hakes is being held constant.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization.

16.6. Argentine short-finned squid (*Illex argentinus*), Falkland Islands

FISHERIES: This squid is usually a major fishery resource of the Falkland Islands in terms of total catch and licensing revenue. *Illex* is targeted by the Asian jigging fleet (mainly from Korea, Taiwan and Japan), and also by some trawlers in February-June. The main fishing area lies in the northern and northwestern parts of the FICZ/FOCZ (north of 51-52°S). Fishing effort was relatively stable during 2000-2004 (80-120 jigging vessels). However due to very low abundance of *Illex* in 2004-2005, it gradually decreased to 35-44 vessels in 2008-2009. After three years of high abundance (2006-2008), *Illex* stocks decreased dramatically in 2009 (similar to situation 2004-2005). In January-February, squid of the South Patagonian stock appeared on the High Seas (45-46°S). The reported catches of trawlers were variable, from 11 to 60 t per day with the average of 18 t per day). This was about a half of that observed during the same period of 2008 when the abundance of *Illex* was extremely high (average catches were ~30 t per day). However, something unusual happened with squid migrations in March. Despite similar sea surface temperatures in 2008 and 2009, the South Patagonian squid never appeared to the south of 48-49 °S. All licensed jigging vessels worked on the High Seas with one-two vessels appearing periodically in FICZ/FOCZ to check the poor fishery situation. As a result, the *Illex* season was the worst in the whole history for the Falkland fishery, with the meagre 45 t total catch. This Falkland Islands fishery was closed early on 15th May.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government.

PRECAUTIONARY REFERENCE POINTS: In the event that the spawning stock biomass is likely to decline below the Precautionary Reference Point of a minimum of 40,000 t, the fishery should be closed.

STOCK STATUS: The status of the stock is changing every year due to the short life cycle of the squid (1 year). The spawning stock size in 2009 in the FICZ is unknown but the catches of *Illex argentinus* in Argentinian and International waters in 2009 declined by more than 50% compared to 2008 and were the lowest in the last 16 years.

RECENT MANAGEMENT ADVICE: Stock management on the High Seas (international waters of 42°S and 45-47°S) remains one of the main issues for management as there is no regulation at present. To be able to predict the stock status for the following fishing season, joint multilateral studies of *Illex* spawning grounds are needed.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization.

16.7. Patagonian squid (*Loligo gahi*), Falkland Islands

FISHERIES: Patagonian squid is the second major fishery resources in the FICZ, and a domestic resource for the Falkland Islands. *Loligo* is targeted almost exclusively by the Falkland-registered trawlers in the southern and eastern parts of the Falkland Shelf (so-called ‘*Loligo* box’). Fishing effort is stable (16 trawlers). In 2009, the abundance of both cohorts of *Loligo* was lower than in the last three years possibly due to continuous delays in spawning because of negative anomalies in ambient water temperatures. The first season yielded 12,989 t, and the second season 17,873 t. In-season stock assessment of the escapement biomass (SSB) during the first season was estimated to be 10,500 t, and therefore was close to the 10,000 t escapement limit. During the second season, only one wave of abundance was observed in the first half of August, and then it was gradually depleted by the fishing fleet. After analysis of SSB, the fishing season was closed early on 11th September to preserve the escapement spawning biomass over 10,000 t. Overall, spawning stock biomass during both seasons was close to the minimum threshold limit.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government.

PRECAUTIONARY REFERENCE POINTS: See management advice.

STOCK STATUS: In 2009 the stocks of both cohorts at the end of the fishing season were consistent with the management objective of maintaining an escapement biomass above 10,000 t.

RECENT MANAGEMENT ADVICE: A minimum spawning stock biomass of 10,000 t at the end of each season.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization.

16.8. Patagonian toothfish (*Dissostichus eleginoides*), Falkland Islands

FISHERIES: *Dissostichus eleginoides* is the most valuable and highly priced resource in the Falkland Zones. One Falkland company holds exclusive rights to fish for toothfish deeper than 600 m in the Falkland Zones.

SOURCE OF MANAGEMENT ADVICE: The Falkland Islands Fisheries Department (FIFD) is responsible for management advice to the Falkland Islands Government.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been established for this stock.

STOCK STATUS: The fishery data for 2009 indicated a stabilised toothfish stock abundance at between 42 – 53% virgin SSB (SSB₀).

MANAGEMENT MEASURES: The spawning grounds, on the Burdwood Bank, were closed between 1st July and 31st August from 2007 in order help the stock rebuild by enhancing potential recruitment. Given the decrease in toothfish abundance within FICZ/FOCZ in 2007, it was recommended that the TAC for 2009 remain at 1,200 t.

RECENT MANAGEMENT ADVICE: Stock assessments indicated that the TAC should remain at 1,200 t for 2009 as was the advice for 2007 and 2008.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock through a regional fisheries organization. It is unclear if this is a separate stock from Patagonian toothfish in Argentine or Falkland Islands' waters, so efforts to improve stock identification are desirable.

16.9. Hoki (*Macruronus magellanicus*), Argentina²

FISHERIES: Hoki is the second main Argentinean finfish species in terms of catches. It is caught by trawlers that process catches on board, and the highest volume is found south of 45°S. The Federal Fisheries Council established a total TAC of 170,000 t for 2009, whereas 190,000 t was permitted to be fished in 2008. Data from the Argentinean Under-Secretariat for Fisheries reported 67,776 t of hoki landed between 1st January and 1st October 2009, 18% less than landings for the same period in 2008 when 82,760 t were landed.

SOURCE OF MANAGEMENT ADVICE: The Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP, National Institute for Research and Fisheries Development) is the organisation responsible to give the necessary scientific support for the rational exploitation of the resources and to avoid over fishing.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: STECF notes that the total estimated biomass made by the Argentinean National Institute for Fisheries research and development (INIDEP) was of 1.2 million t at the beginning of 2008.

RECENT MANAGEMENT ADVICE: STECF did not have access to management advice for this stock

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization. It is not clear if hoki in the

²Information for Section 6 was collected through the Internet from several official organisations such as SAGP&A, DNPYA, CFP, INIDEP, etc, as well from specialized fisheries magazines (FIS and Pescares).

Argentinean EEZ constitutes a separate stock from hoki in the Falkland Islands' zone and/or in International waters. Efforts to improve stock identification are desirable.

16.10. Patagonian grenadier (*Macrourus carinatus*, *Macrourus holotrachys*), Argentina

FISHERIES: STECF did not have access to any information on fisheries for Patagonian grenadier in Argentinean waters.

SOURCE OF MANAGEMENT ADVICE: The Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP, National Institute for Research and Fisheries Development) is the organisation responsible to give the necessary scientific support for the rational exploitation of the resources and to avoid over fishing.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: STECF did not have access to any stock assessment in this area.

RECENT MANAGEMENT ADVICE: STECF did not have access to management advice for this stock

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic.

16.11. Southern blue-whiting (*Micromesistius australis australis*), Argentina

FISHERIES: The abundance of southern blue whiting in Argentine waters declined in 2005, after having been stable prior to 2001 and increasing since that time. Since 2001, annual catches have been on average around 45,000 t, but in 2005, the landings of this species totalled 34,735 t. The same declining situation seems to have continued in 2006, according to official statistics. The SAGP&A figures indicate that between January and December 2007, 18,982t of southern blue whiting were landed, 39.3 % less than in 2006 (31,286 t). Between 1st January and 31st December 2008, 18,996t of southern blue whiting were landed according to SAGP&A statistics. 13,118 t of southern blue whiting were landed in the first nine months of 2009, 9,8% more than in the same period 2008.

SOURCE OF MANAGEMENT ADVICE: INIDEP is the main advisory body.

PRECAUTIONARY REFERENCE POINTS: $F_{30\%}=0.20$ and $F_{0.1}=0.14$ were established by INIDEP in 2001 as biological reference points for southern blue whiting.

STOCK STATUS: Mean annual CPUE values for the Argentinean surimi fleet between 1992-2007 indicated a declining trend in abundance throughout the whole period. For the period 1987-2007, biomass declined up to 2002 and has remained relatively stable in recent years. Total biomass at the beginning of 2007 was estimated at around 560,000 t and SSB was estimated to be 468,000 t. The actual exploitation rate was estimated at $F=0.51$, similar to that of 2006 when catches were also similar.

RECENT MANAGEMENT ADVICE: A TAC of 60,000 t was recommended by INIDEP for 2009.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization. It is not clear if southern blue whiting in Argentinean waters constitutes a separate stock from those fish in Falklands' and/or International waters, so efforts to improve stock identification are desirable.

16.12. Red cod (*Salilota australis*), Argentina

FISHERIES: Red cod is caught inside Argentinean waters by bottom trawlers and by artisanal fleets. Red cod landings, increased from 1990, reaching a maximum of 14,900 t in 1998. Most of the catches (85%) were obtained by the fleet operating around the Falkland/Malvinas Islands. The main fishing grounds were located to the SW of the islands during the spawning season (September-October).

According to data from SAGP&A, total landings of red cod by all fleets (artisanal, bottom trawlers, longliners, etc) in Argentinean ports in 2008 amounted to 8,010 t, representing almost twice the reported landings in 2007 (4,611 t) and almost four times the reported landings in 2006 (2,427 t). From the 1st of January until the 15th of

October 2009, a total of 5032 t of red cod were landed, a figure very similar to that for the same period in 2008 (5,484 t).

SOURCE OF MANAGEMENT ADVICE: INIDEP is the main advisory body.

PRECAUTIONARY REFERENCE POINTS: Unknown

STOCK STATUS: Stock status is unknown

RECENT MANAGEMENT ADVICE: Considering the mean biomass estimates during the 1992-1998 period, taking F_{safe} as an objective would imply allowing a maximum catch of 14,200 annual t in the area where the Argentine fleet operates. A TAC of 5,000 t was set by the Federal Fisheries Council (CFP) for 2005. No updated information is available on this subject.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization. It is not clear if red cod in Argentinean waters constitutes a separate stock from those fish in Falklands' and/or International waters, so efforts to improve stock identification are desirable.

STECF notes the increase of officially reported landings between 2006 and 2008 (2,427 t in 2006, against 8,010 t in 2008).

16.13. Argentine hake (*Merluccius hubbsi*), Argentina

FISHERIES: Argentine hake is targeted inside Argentinean waters by bottom trawlers and by artisanal vessels using different fishing gears. Important amounts of juveniles are discarded in the shrimp fisheries carried out by trawlers around San Matias Gulf.

Data from the Argentinean under Secretariat for Fisheries reported 263,323 t of Argentine hake landed in 2008, against 299,605 t in 2007 and 353,423 in 2006. Between the first of January and the 15th of October 2009, 198,263 t were landed: a similar figure to that in 2008 during the corresponding period (208,729). Of total landings of hake in 2009, 160,027 t related to the Southern stock and 38,234 t to the Northern stock.

SOURCE OF MANAGEMENT ADVICE: INIDEP is the main advisory body.

PRECAUTIONARY REFERENCE POINTS: A SSB of 130,000 t for 2008 was proposed by INIDEP for the hake stock north of 41° S³. Due to the large decrease in population abundance and to low recruitments in recent years indicating the possibility of recruitment overfishing, it was advised that catches in 2008 ranged from 41,000 t to 48,000 t with the aim of achieving recovery of SSB to levels between 130,000 t - 200,000 t in the short-medium term according to the following table:

Objective	SSB > 130.000 t		SSB > 200.000 t	
	F	TAC 2008 (t)	F	TAC 2008 (t)
<i>Short term</i>	0,336	40.939	0,121	15.915
<i>Medium term</i>	0,525	59.332	0,407	48.119

STOCK STATUS: Assessment of the status of the stock north of 41° S between 1986 and 2007, made by INIDEP in 2008⁴ revealed a higher presence of age-group 2 since 2002. In 2005 70% of the catch was composed by age-group 2, whilst in 2006 and 2007 most of the catch was due to age group 3, followed by age-groups 2 and 4. Recruitments in 2005 and 2006 were the lowest of the historical series. SSB is estimated to be well below the precautionary reference point for this stock (130,000 t). The estimated abundance of mature hake in 2008 was the lowest observed for the period 2005- 2008, (INIDEP Technical Report 18/08 (precursor to 243/08).

The results of the juvenile common hake survey carried out in January by the National Institute for Fisheries Research and Development (INIDEP) show that the three-year decline registered from 2005 to 2008 within the north Patagonian breeding ground has reversed somewhat. CPUE, as much in weight as in number of fish, has

³ Inf. Téc. INIDEP N° 32.

⁴ Op. Cit.

doubled since last year. Nonetheless, both figures are still well below those observed in 2005, thus the general state of the resource is still critical.

MANAGEMENT MEASURES: Several closed areas and/or seasons have been implemented in recent years by Argentinean authorities. Some of the protected areas are the nursery grounds around Isla Escondida and the shrimp fishing area around San Matias Gulf. Different Conservation measures are in force to the north and south of parallel 41° S respectively.

The permanently banned area of argentine hake has recently been extended to include the northern half of the 4160, 4260, 4261 and 4262 quadrants, as announced by the Secretariat of Agriculture, Livestock, Fisheries, and Food (SAGP&A). The measure had been recommended in April by the National Institute for Fisheries Research and Development (INIDEP), after evaluating hake juvenile numbers in the area. The goal is to strengthen non-adult hake conservation measures, including protection of recent spawners and one year-olds.

RECENT MANAGEMENT ADVICE:

The Argentine Fisheries and Aquaculture Subsecretariat (SSP&A) will allow fishing to take place in an area located inside the permanent closed hake zone, after a weaker presence of juveniles was detected in the zone. Under a precautionary approach, INIDEP also recommended the preventative closure of the statistical quadrant located between parallels 47° and 48° South and Meridians 64° and 65° West. The initiative follows a similar one that took place in March 2009, when CFP determined that it was convenient to open north statistical quadrant 4160 and close southern quadrant 4764.

A system of individual transferable quotas (ITQs) for common hake (*Merluccius hubbsi*) will come into effect as of January 2010 and will be in place for 15 years.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization. It is not clear if hake in Argentinean waters constitutes a separate stock from those fish in Falklands' and/or International waters, so efforts to improve stock identification are desirable.

16.14. Argentine short-finned squid (*Illex argentinus*), Argentina

FISHERIES: *Illex argentinus* is the major Argentine cephalopod fishery resource. Artisanal vessels have exploited the species in Argentinean waters since 1946. Up to 1977 catches were taken as by-catch in the trawl fishery for hake. Then, trawler catches increased reaching 59,000 t in 1978. From 1993 a target fishery was developed with the incorporation of domestic (41) and chartered (45) jigging boats, which increased the catches to 204,730 t that year. Total catches ranged between 377,150 t in 1997 and 127,386 t in 2003. In the whole period, total number of jigging boats varied between 65 and 150. The Argentinean under Secretariat for Fisheries reported 233,068 t of *Illex* squid landed in 2007 against the 291,916 t landed in 2006, representing a reduction of about 20%. During 2008, 255,531 tonnes of *Illex* were landed in Argentine maritime ports (SAGP&A), an increase compared to 2007.

In 2009, the *Illex* squid season within the Argentinean EEZ closed with one of the worst registries in the history. Official statistics by SAGP&A reveal that 65,610 t of Argentine short-finned squid were landed from 1 January to 4 September, a fall of 75.7% in relation to the 251,893 t landed in the same period 2008. The squid jigger fleet landed 50,700 t of squid; fresh fish vessels, 5,353 t; while 5,081 t were unloaded by trawlers, among other vessels.

The future forecast is also worrisome because scientists lack sufficient data to project the evolution of the resource. To date, the expeditions for the evaluation of the North-Patagonic Buenos Aires Stock and for the estimation of indices of juvenile abundance of the Spring Spawning Stock were not undertaken.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the Instituto Nacional de Investigación y Desarrollo Pesquero (INIDEP), together with input from Comisión Técnica Mixta del Frente Marítimo (CTMFM) for the Common Fishing Zone of Argentina and Uruguay (north management area) and the South Atlantic Fisheries Commission (SAFC) for the south management area.

MANAGEMENT MEASURES: Prior to 1995 management measures were agreed between the UK and Argentinian authorities. However, talks broke down in 2005 and since that time, there have been no jointly agreed management decisions.

With the introduction of the 25 year licencing system introduced in 2005, the previously agreed management measure of allowing 40% SSB escapement is also no longer in place.

PRECAUTIONARY REFERENCE POINTS: STECF is unaware of any currently agreed precautionary reference points for the management of the stock in Argentinean waters.

STOCK STATUS: During a cruise carried out by INIDEP in February 2005 for assessment of *Illex* pre-recruits, mean density in the total survey area of (2.18 t/nm²) was higher than that observed in 2004 (1.15 t/nm²). Observed mean density south of 48° S (0.90 t/nm²) was also higher than in 2004 (0.19 t/nm²). Mean density north of 48° S was 3.77 t/nm². Total pre-recruit estimates (121,355 t, +/- 39,081 t and 468 million individuals) indicate an increase in biomass and number with respect to 2004, but remained lower than the 1995 estimate, which was previously the lowest on record.

As with other short-lived species, annual fluctuations of the abundance of the Argentine short-finned squid stocks were observed in the period 1993-2003. A recruitment failure in the South Patagonian and Bonaerense North Patagonian Stocks (SPS and BNPS respectively) in 2004 resulted in a collapse of the fishery. As a result, Summer Spawning Stock (SSS) accounted for most of the Argentine catches in 2004 (70,000 t).

Current stock status is unknown to STECF.

A report by INIDEP⁵ on the status of the fishery for 2008 (in press) indicate recruitment estimations of 683,838 t for the SPS stock at the start of the fishery (week 1) and a escapement of 22.95 % (183,303 t) for week 24. Recruitment estimations for the BNPS stock at the start of the fishery (week 19) were 171,201 t and an escape of 34.12 % (25,797 t) for week 36.

MANAGEMENT MEASURES: A ban on squid (*Illex argentinus*) fishing for all types of vessels for the area south of parallel 44° 30' south was decided upon by the Argentine Under Secretariat of Fisheries and Aquaculture (SSP&A), as of 11 April 2005. The Federal Fisheries Council (CFP) asked the Enforcement Authority to proceed with the closure of the squid (*Illex argentinus*) fishery south of parallel 42° 15' S as of 28 May 2005. Another ban north of 39° 40' S was decided by CFP to be enforced as of 27 June 2005. No new management measures are known by the STECF.

RECENT MANAGEMENT ADVICE: STECF is unaware of any recent management advice for *Illex argentinus* in Argentinean waters.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization. It is not clear if *Illex argentinus* in Argentinean waters constitutes a separate stock from *A. argentinus* in Falklands' and/or International waters, so efforts to improve stock identification are desirable.

16.15. Patagonian squid (*Loligo gahi*), Argentina

FISHERIES: *Loligo gahi* abundance is lower inside the Argentine EEZ than in other areas, some quantities are caught as a by-catch by bottom trawlers in the finfish fisheries and perhaps by artisanal fleets. Total landings of Patagonian squid by all fleets (artisanal, bottom trawlers, longliners, etc) in Argentinean ports were 238 t during 2007, 234 t in 2008 and 85 t in 2009 up to 15th October.

SOURCE OF MANAGEMENT ADVICE: INIDEP is the organisation responsible to give the necessary scientific support for the rational exploitation of the resources and to avoid over fishing.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: STECF did not have access to any stock assessment in this area.

RECENT MANAGEMENT ADVICE: Unknown.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization. It is not clear if *Loligo gahii* in Argentinian waters constitutes a separate stock from those fish in Falklands' and/or International waters, so efforts to improve stock identification are desirable.

⁵ *Illex argentinus*. Pesquería 2008 (in press)

16.16. Patagonian toothfish (*Dissostichus eleginoides*), Argentina

FISHERIES: Patagonian toothfish in Argentine waters is fished by trawlers and longliners. SAGP&A figures for 2008 indicate that 2,159t of Patagonian toothfish were landed, an increase of about 15% in relation to 2007 (1,846 t). Up to the 1st of October 2009, landings of toothfish by Argentinean vessels were 1,051 t, 36% less than the 1,648 t landed in the same period in the previous year (2008).

SOURCE OF MANAGEMENT ADVICE: INIDEP is the organisation responsible to give the necessary scientific support for the rational exploitation of the resources and to avoid over fishing

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: A recent report by INIDEP (2007)⁶ concluded that the state of the fishery for Patagonian toothfish in the Argentinean waters continues its trend toward a more favourable situation due to the strategies implemented by management, particularly since 2003. In 2009, the Federal Fisheries Council indicated that fishery of Patagonian toothfish “shows a trend towards stability and the existence of some positive signs, like the low portion of juvenile specimens present in the catch.”

RECENT MANAGEMENT ADVICE: A TAC of 2,500 t was set by the Federal Fisheries Council (CFP) for 2009, the same than in 2008. The TAC established is based on criteria for prevention, and was agreed on after evaluating the technical report drafted by the National Institute of Fisheries Research and Development (INIDEP) on the state of the resource.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization. It is not clear if Patagonian toothfish in Argentinian waters constitutes a separate stock from those fish in Falklands’ and/or International waters, so efforts to improve stock identification are desirable.

16.17. Patagonian shrimp (*Pleoticus muelleri*), Argentina

FISHERIES: Patagonian shrimp is fished by beam trawlers operating in the Gulf of San Jorge waters under a license regime by the Federal Fisheries Council (CFP). In 2007 47,623 t of shrimp were landed into Argentinean ports, a similar figure to that for 2006 (44,410 t). Landings in 2008 were 47,406 t.

Usually, most of the catches are taken by the freezer trawler fleet (37,000 in 2008 representing 92% of the total catch).

The Secretariat of Agriculture, Livestock, Fisheries, and Food (SAGP&A) reported that a total of 45,134 t of shrimp (*Pleoticus muelleri*) were landed between 1st January and 15th October 2009. This volume represents an increase of 9.7% in terms of the 41,111 t landed in the same period of 2008. At any rate, landings have been falling from 1 August to 15 October 2009.

Patagonian shrimp catches (1989-2008)

Year	Tons	Year	Tons
1989	11,353	2000	37,150
1990	9,648	2001	78,798
1991	8,337	2002	51,389
1992	24,495	2003	52,896
1993	19,271	2004	27,030
1994	16,670	2005	7,470
1995	6,203	2006	44,410
1996	9,874	2007	47,623
1997	6,482	2008	47,406
1998	23,333	2009	45,133*
1999	15,988		

* Provisional data (01/01/2009-15/10/2009)

⁶ INIDEP Inf. Téc. INIDEP N° 4. 27-12-07. 9 pp.

SOURCE OF MANAGEMENT ADVICE: INIDEP is the organisation responsible to give the necessary scientific support for the rational exploitation of the resources and to avoid overfishing.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: Unknown.

MANAGEMENT MEASURES: A closure of the fishery was put in force by mid October 2008 in the area contained by the parallels 42°-47° S, the meridian 62° W and the line of national jurisdiction.

The Federal Fisheries Council (CFP) decided to close the zone located between parallels 44° and 45°, in national jurisdictional waters. The measure, which entered into force on the 17th October 2009, obeys the fact that the breeding of common hake (*Merluccius hubbsi*), a species that is usually captured incidentally, begins in that zone at this time of year.

RECENT MANAGEMENT ADVICE: Unknown.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organization.

16.18. Kingclip (*Genypterus blacodes*), Argentina

FISHERIES: Kingclip is one of the most important demersal fishes in Argentine waters. It is found between 35° and 55°S, reaching high concentrations in summer between 42° and 48°S. In winter, schools disperse over the whole range of distribution. The Argentine kingclip fishery started developing in 1986 when catches surpassed 15,000 t/year. Landings have been stable in recent years at around 23,000 t/year up to 2005. Landings in 2006, 2007 and 2008 were 20,551 t, 20,581 t and 17,559 t respectively. Preliminary data on landings by SAGP&A reported 13,902 t between 1st January and 15th October 2009. Approximately 50% of the total catch of kingclip is caught as by-catch by bottom trawlers that direct their effort to hake (*Merluccius hubbsi*).

SOURCE OF MANAGEMENT ADVICE: INIDEP is the organisation responsible to give the necessary scientific support for the rational exploitation of the resources and to avoid over fishing.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

– **STOCK STATUS:** Not precisely known

MANAGEMENT MEASURES: A TAC of 16,000 t of kingclip was established by the Federal Fisheries Council of Argentina (CFP) for 2008.

RECENT MANAGEMENT ADVICE: Unknown.

STECF COMMENT: STECF notes the need for a multilateral approach for the assessment and management of the fisheries in the SW Atlantic through a regional fisheries organisation.

16.19. Hoki (*Macruronus magellanicus*), International waters

Information on biomass of the species presented in sections 6.19 to 6.25 was extracted from the reports of the two research cruises for assessment of fishery resources on the High Seas of the SW Atlantic carried out by the IEO between 10th of March -18th April 2008 and between 24th of February-1st April 2009 (del Río *et al.*, 2008 and 2009). It is expected that the historical series of fisheries research cruises started by IEO in 2008 and continued in 2009 could provide useful information on the stock status in the coming years.

FISHERIES: Hoki is fished as a by catch during *Illex* and hake fisheries by bottom trawlers from several countries, mainly Spain.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: The swept area biomass estimates for this stock in 2008 and 2009 were 13,792 t and 8,497 t respectively, representing a decline of 39% in 2009 compared to the previous year. Biomass was observed to be highest at depths between 401 and 700 m in both years.

RECENT MANAGEMENT ADVICE: At present there is no management of the fisheries exploiting *Macruronus magellanicus* in International waters of the Southwest Atlantic.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock through a regional fisheries organization. It is unclear if this is a separate stock from hoki in Argentine or Falkland Islands waters, so effort should be made to improve stock identification.

16.20. Patagonian grenadier (*Macrourus carinatus*, *Macrourus holotrachys*), International waters

FISHERIES: Commercial catches of *Macrourus carinatus* and *Macrourus holotrachys* are negligible in the area where the fisheries take place in international waters (<300 m depth). Results from the two mentioned research surveys carried out by IEO indicate that despite being the most abundant species in the study area, Patagonian grenadier (*Macrourus carinatus*) is mainly distributed between 500-1000 m depth, far beyond the depth range in which the fleet operates (98% of the commercial hauls at less than 300 m depth). Similarly, *Macrourus holotrachys* has its highest densities between 1001-1500 m depth.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: The only estimates of stock biomass are those derived from the two research surveys undertaken by the IEO in March-April 2008 and February-March 2009. *Macrourus carinatus* was found to be the most abundant species during both research cruises with an estimated swept area biomass of 116,679 t in 2008 and 212,768 t in 2009. This represented an increase of about 82% in 2009 with respect to 2008. *Macrourus carinatus* is distributed between 200 and 1500 m, but with the highest catches between 501 and 1000 m depth. In terms of abundance, *Macrourus holotrachys* was the seventh largest stock among the 12 assessed commercial species, with an estimated biomass of 4,178 t and 5,479 t in 2008 and 2009 respectively. The highest catches were taken between 1001-1500 m depth in both years.

RECENT MANAGEMENT ADVICE: At present there is no management of the fisheries exploiting *Macrourus carinatus* and *Macrourus holotrachys* in International waters of the Southwest Atlantic.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock through a regional fisheries organization. It is unclear if this is a separate stock from Patagonian grenadier in Argentine or Falklands waters, so efforts to improve stock identification are desirable.

16.21. Southern blue-whiting (*Micromesistius australis*), International waters

FISHERIES: Southern blue whiting is fished as by catch during *Illex* and hake fisheries by bottom trawlers from several countries, mainly from Spain.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: biomass estimates from the aforementioned IEO surveys gave biomass estimates for 2008 and 2009 of 858 t and 710 t of southern blue whiting, distributed between 300 and 700 m, but with most of the catches obtained at 501-700 m depth.

RECENT MANAGEMENT ADVICE: At present there is no management of the fisheries exploiting *Micromesistius australis* in International waters of the Southwest Atlantic.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock through a regional fisheries organization. It is unclear if this is a separate stock from southern blue whiting in Argentine or Falkland Islands waters, so efforts to improve stock identification are desirable.

16.22. Red cod (*Salilota australis*), International waters

FISHERIES: Red cod is caught as by-catch in hake and *Illex* squid fisheries by bottom trawlers from several countries, mainly from Spain.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: A biomass of 118 t (2008) and 163 t (2009) of red cod was estimated during the IEO cruises in 2008 and 2009.

RECENT MANAGEMENT ADVICE: At present there is no management of the fisheries exploiting *Salilota australis* in International waters of the Southwest Atlantic.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock through a regional fisheries organization. It is unclear if this is a separate stock from red cod in Argentine or Falkland Islands waters, so efforts to improve stock identification are desirable.

16.23. Argentine hake, Austral hake (*Merluccius hubbsi*, *Merluccius australis*), International waters

FISHERIES: Argentine hake is targeted by bottom trawlers from several countries, mostly Spain. International waters are the most important area for Spanish trawlers targeting for hake in the SW Atlantic. The highest catches for this fleet in the Patagonian Shelf were observed in 1990 with more than 100,000 t, corresponding most of them to the High Seas. The main fishing grounds for *M. hubbsi* are located between parallels 44-48° S. Relatively low catches of the order of 50 t annually of *M. australis* have been reported from this area.

The maximum effort in terms of numbers of vessels in International waters and Falkland Islands by Spanish vessels was reported in 1990 (c. 100 vessels) and has decreased since then, mainly due to the development of new fisheries in other areas (i.e the North West Atlantic, NAFO fisheries). Currently, the number of fishing units flagged to Spain operating in this area is around 27 vessels.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: The swept area biomass estimates for Argentine hake from both surveys were 15,877 t (2008) and 18,512 t (2009), with highest biomass below 200 m depth. No specimens of *M. hubbsi* were taken at depths greater than 300 m. The bathymetric distribution of this species was very similar during both cruises.

Austral hake was the least abundant commercial species in the cruise of 2008, with an estimated swept area biomass of only 48 t. The 2009 estimate was 206 t.

RECENT MANAGEMENT ADVICE: At present there is no management of the fisheries exploiting *Merluccius hubbsi* and *Merluccius australis* in International waters of the Southwest Atlantic.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock through a regional fisheries organization. It is unclear if hakes in international waters constitute separate stocks from those in Argentine or Falkland Islands' waters, so efforts to improve stock identification are desirable.

16.24. Argentine short-finned squid (*Illex argentinus*), International waters

FISHERIES: The Argentine short-finned squid (*Illex argentinus*) is a common neritic species occurring in waters off Brazil, Uruguay, Argentina, the Falkland/Malvinas Islands and on the High Seas in the southwest Atlantic. *Illex* is the most important cephalopod species in the area and plays a significant role in the ecosystem. It is the target of major fisheries using both trawlers and jigging vessels during the first half of the year. Bottom trawlers are mainly from Spain, whereas jiggers belong to several Asian countries such as Japan, Korea and Taiwan. The main fishing area on the High Seas is between parallels 44-47° S.

Concentrations of short-finned squid are found 45-46° S in January or February and the animals gradually migrate southward towards the Falkland Islands while growing rapidly. Peak concentrations are found around the Falkland Islands between March and May. Towards the end of this period, animals start migrating northward to spawn and die around July or August.

Since the early 1980s, Argentine short-finned squid have been caught by Spanish bottom trawlers as by-catch in the hake fishery. Currently, this squid species is considered as one of the target species for the Spanish fleet operating in the Southwest Atlantic, with mean annual catches of about 35,000 t. As an annual species, its catches fluctuate markedly from year to year depending on environmental conditions.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: The swept area biomass estimates for Argentine short-finned squid from the IEO surveys was 45,073 t in 2008 and 22,149 t in 2009 (around 50% less).

RECENT MANAGEMENT ADVICE: At present there is no management of the fisheries exploiting *Illex argentinus* in International waters of the Southwest Atlantic.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock through a regional fisheries organization. It is unclear if this is a separate stock from *Illex argentinus* in Argentine or Falkland Islands' waters stocks, so efforts to improve stock identification are desirable.

16.25. Patagonian squid (*Loligo gahi*), International waters

FISHERIES: *Loligo gahi* is caught in relatively small quantities as by-catch by bottom trawlers during hake and *Illex* fisheries. The main fishing area is around parallel 42° S, where big catches of mainly juvenile Patagonian squid have been reported in different years by observers on board of Spanish vessels.

SOURCE OF MANAGEMENT ADVICE: No management advisory body exists for International waters of the Patagonian Shelf.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been defined for this stock.

STOCK STATUS: The study area of the IEO research cruises aimed at the measurement of commercial stocks did not cover the main commercial fishing area for this species, i.e. around parallel 42° S. The swept area biomass estimates for *L. gahi* in 2008 and 2009 were 2,108 t and 1,867 t respectively. Spatial distribution of this species was similar in both cruises, with the highest estimates at depths less than 200 m and south of parallel 46° S.

RECENT MANAGEMENT ADVICE: At present there is no management of the fisheries exploiting *Loligo gahi* in International waters of the Southwest Atlantic.

STECF COMMENTS: STECF notes the need for a multilateral approach for the assessment and management of this stock through a regional fisheries organization. It is unclear if this is a separate stock from Argentine or Falklands stocks, so effort should be made to improve stock identification.

17. Resources in the Mediterranean Sea (GFCM)

The Management advisory body is the Scientific Advisory Committee (SAC) of the General Fisheries Commission for the Mediterranean (GFCM). The SAC is organised in Sub-Committees. The Sub-Committee on Stock Assessment (SCSA) gives advice on stock status.

One of the objectives of the GFCM SCSA, is to enhance of joint practical stock assessment involving the participation of scientists from different Geographical Sub-Areas (GSAs) who provide their data and share them with their colleagues, using standard methodologies and analyzing together the results and options for fisheries management. The process, based on undertaking joint practical session to assess in particular the stocks of hake and associated species, was launched in 2008, during the SCSA Working Group on Demersal species (Turkey, September 2008). The assessments were carried out using both commercial catches and trawl survey data.

During its thirty-third session, the Commission endorsed the proposal of the Scientific Advisory Committee (SAC) aimed to reconsider the functioning of the Workings Groups on Stock Assessment of demersal and small pelagic species. Under this new vision, in 2009 the SCSA Working Group on demersal species would carry out its work into four thematic sub-groups (crustaceans, hake, mullets and other species). The Working Group on small pelagic species carried out its work on sardine and anchovy according the SAC proposal. In both cases the work will deal exclusively with practical stock assessments using standard methodologies.

The outcome of the assessments already undertaken by national experts within the data collection national programmes, FAO Regional projects and/or other international initiatives should be presented directly to the SCSA meeting for review.

With the aim of establishing the scientific evidence required to support development of long-term management plans for selected fisheries in the Mediterranean, consistent with the objectives of the Common Fisheries Policy, and to strengthen the Community's scientific input to the work of GFCM, the Commission made a number of requests to STECF. In order to meet these requests, a series of STECF SubGroups on the Mediterranean were initiated in 2008 (SGMED Working Group). In 2009 SGMED-09-02 Working Group on the Mediterranean Part I took place at Villasimius, Sardinia, (Italy) in June 2009. The SGMED-09-03 Assessment of Mediterranean stocks – Part II will be held in December 2009 at Barza d'Ispra (Italy). They will produce short and medium term projections regarding the assessments discussed in the previous meeting.

The GFCM Working Groups on the Demersal Stocks and on the Small Pelagic Stocks were held at Ancona (Italy) in October 2009, from 19 to 23 and from 26 to 30 respectively, that is in the same days and just after the STECF SGECA RST 09 03. The GFCM SCSA will take place at Malaga in November. Consequently, the update of the Mediterranean stocks was done on the basis of the assessments presented at the SGMED 09 02 Working Group.

Only eighteen updated stock assessments were available from the SGMED 09-02 Working Group. Six of them regarded small pelagic fish (sardine and anchovy) in three Geographical Sub-Areas (GSAs 16, 17, and 22). Twelve assessments dealt on demersal stocks covering eight GSAs (06, 09, 10, 11, 15, 16, 17, and 25) and seven species.

STECF appreciates the efforts made by GFCM and SGMED in the recent years to harmonize the assessment of the most important stocks among the different Mediterranean countries but notes that, in spite of this, most of the Mediterranean stocks are not yet assessed on a regular basis in all GSAs.

STECF recommends that Member States should present assessments for all the stocks included in the regulations 1639/2001 and 1581/2004 for each GFCM sub-area under European Community jurisdiction.

STECF notes that the cooperation between Member States, GFCM and SGMED should be further improved in order to provide annual assessment of all stocks listed in the regulations 1639/2001 and 1581/2004, taking into account that national programmes for data collection are in force.

Finally, STECF suggests that in the next years there will be a better coordination between GFCM-SCSA, SGMED and SGECA Working Groups so that the SGECA WG will be able to review all the updated stock assessments and advices that will be presented for the Mediterranean Sea.

17.1. European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 1. Northern Alboran Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The purse seine fleet operating in GSA 01 Northern Alboran Sea is composed by 136 units, characterised by small vessels. 22% of them are smaller than 12 m, 78% between 12 and 24 m. The fleet has been continuously decreasing since eighties, from more than 230 vessels in 1980 to 136 in 2007.

Anchovy and Sardine (*Sardina pilchardus*) are the main target species of the purse seine fleet in Northern Alboran GSA01, but other species with lower economical importance are also captured, sometimes representing a high percentage of the capture: horse mackerel (*Trachurus spp.*), mackerel (*Scomber spp.*) and gilt sardine (*Sardinella aurita*).

Anchovy is the species with the highest economical value. The annual landings of anchovy for the last eighteen years ranged between 200 and 3000 tons. During the period from 1990-2007, the catches of anchovy stock in the Alborán Sea showed marked fluctuations. A successful recruitment, estimated by echo-acoustic tracking, was observed during 2001 in the Alborán Sea producing a strong increment of landings in 2002. Nevertheless, the catch dropped in 2003, continuing at low level to 2007. Málaga Bay is the most important recruitment and fishery area. Only this area, which represents 85% of total landings, has been considered.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Biomass estimation comes from acoustic surveys and from commercial landings and CPUEs. Nevertheless, no acoustic survey was performed in 2007, so management advice was based on landings and CPUEs.

From 2008 advice is provide also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: GFCM-SAC estimated low levels of biomass, recruitment and catch from 2003 to 2006. Low catches in 2007. However, there is some uncertainty about the status of the stock.

SGMED estimated that both total biomass in 2007 (TB=633 t) and Spawning Stock Biomass in 2007 (SSB=378 t) are the lowest of the series 2002-2007, continuing with the decreasing trend observed since 2004. Recruitment levels in 2006 and 2007 are the lowest of the time series (R06=48 millions and R07=54 millions). Since 2002 fishing mortality (F0-2) has varied between 3.9 and 0.6. The maximum was observed in 2002, then falling down to the minimum in 2003. Since then, F shows an increasing trend (F07=1.82).

RECENT MANAGEMENT ADVICE: Fishing effort should be reduced, unless there is an increase in recruitment evident from the 2008 autumn acoustic survey. It should be noted that small pelagic fishery in GSA 01 is multispecies and effort on sardine and anchovy should be considered together. According to SGMED recent assessment (2008) fishing mortality should be reduced in order to allow future recruitment contributing to stock recovery. This requires consideration of the mixed fisheries nature of the fleets.

STECF COMMENTS: STECF agrees with the advice of the GFCM-SAC Sub-Committee on Stock Assessment (SCSA) and with SGMED. STECF recommends to carry out acoustic survey each year and to examine the introduction of closed areas and/or seasons in order to protect recruits or spawning stock.

17.2. European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 3. Southern Alboran Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The purse seine fleet operating in GSA 03 Southern Alboran Sea is composed of about 150 boats distributed in seven Mediterranean ports.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Data sources were acoustic surveys and landings.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No assessment has been presented to SAC-GFCM Sub-Committee in 2008.

The biomass estimate obtained by the acoustic survey performed in May 2006 is 3700 tons.

RECENT MANAGEMENT ADVICE: No specific advice is given by the GFCM-SAC Sub-Committee on Stock Assessment (SCSA).

STECF COMMENTS: STECF notes that the information presented on this stock and fishery is poor and in the absence of any reliable biological reference points, is unable to assess the status of the resource or its exploitation rate. Consequently, STECF is unable to advise on an appropriate exploitation rate for this stock.

17.3. European anchovy (*Engraulis encrasicolus*) in Geographical Sub area 6. Northern Spain

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The purse seine fleet operating in GSA 06 Northern Spain is composed by 132 units: 4% are smaller than 12 m in length, 87% between 12 and 24 m and 9% bigger than 24 m. The fleet continuously decreased in the last twelve years, from more than 222 vessels in 1995 to 132 in 2007. This stronger reduction (41%) is possibly related to a decreasing in anchovy catches.

Anchovy and Sardine (*Sardina pilchardus*) are the main target species of the purse seine fleet in Northern Spain GSA06, but other species with lower economical importance are also captured, sometimes representing a high percentage of the capture: horse mackerel (*Trachurus spp.*), mackerel (*Scomber spp.*), and gilt sardine (*Sardinella aurita*).

Anchovy is the species with the highest economical value. The annual landings of anchovy in the Northern Spain for the last seventeen years ranged between 2000 and 23000 tons. The minimum values were recorded during 2007.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. This assessment is based on acoustic surveys, commercial landings and CPUEs. A DEPM evaluation was carried out in June 2007.

From 2008 advice is provide also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: GFCM-SAC estimated very low level of biomass. Anchovy biomass in year 2007 was the lowest for the past 8 years, 4906 tons, 40% lower than in year 2006. The recruitment has been low, the population consists almost exclusively of the recruits and has practically disappeared between southern Rosas Bay and Tarragona (North Ebro River Delta).

SGMED estimated that both total biomass (TB=7,860 t) and Spawning Stock Biomass in 2007 (SSB=5,480 t) continues the sharp decrease, apparent from the beginning of the time series. The lowest observed SSB is the most recent estimate from 2007 (Bloss=5,480 t). Recruitment in 2007 (R=244 millions) decreases from that of 2006 (361 millions). WG highlighted that the fishery is highly dependent of the recruitment strength. Fishing mortality has been fluctuating around 1.15, without a clear trend. $F_{(0-2)}$ in 2007 = 1.17.

RECENT MANAGEMENT ADVICE: According to GFCM-SAC fishing effort should be reduced. It should be noted that small pelagic fishery in GSA 06 is multispecies and effort on sardine and anchovy should be considered together. According to SGMED recent assessment (2008) fishing mortality should be reduced in order to allow future recruitment contributing to stock recovery. This requires consideration of the mixed fisheries nature of the fleets.

STECF COMMENTS: STECF agrees with the advice of the GFCM-SAC Sub-Committee on Stock Assessment (SCSA) and with SGMED. Because the stock is shared between the GSA 06 (Northern Spain) and the GSA 07 (Gulf of Lions), STECF recommends joint acoustic surveys covering both GSAs.

17.4. European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 7. Gulf of Lions

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: In the Gulf of Lions, pelagic fisheries are targeting anchovy and sardine (*Sardina pilchardus*). An average of 50 trawlers have targeted these pelagic species in recent years. There are also 14 purse seiners operating in the south of the Gulf of Lions that catch these species. Some purse seine boats from Spain come in the area to fish mainly sardine. Fishing effort depends on market fluctuations.

The annual landings of anchovy in the last years are between 2000 and 7000 t (3000 t in 2007).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. The data sources were time series of acoustic surveys, landings and CPUE. The acoustic surveys are performed at daytime in July. The acoustic assessment results are completed by an analysis of catches and fishing effort to improve the fisheries diagnoses.

The anchovy stock has also been evaluated by the DEPM in 2007 in the area corresponding to Gulf of Lions and North Catalan Sea.

From 2008 advice is provided also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: GFCM-SAC indicate that the anchovy biomass estimate in GSA 07 with acoustic survey shows a decrease from 26000 t in 2006 to 18500 t in 2007. The DEPM spawning biomass estimate for the Gulf of Lions – North Catalan Sea was 21000 t in 2007.

SGMED is unable to precisely estimate the absolute levels of stock abundance and biomass. Survey indices indicate that recent stock biomass (2005-2007) remains at the lowest level observed since 1993. The acoustic method applied results in an estimate of 18,473 t of total biomass in 2007. Recruitment since 2004 is estimated to be low in relation to the time series available.

RECENT MANAGEMENT ADVICE: It is recommended not to increase the fishing effort.

STECF COMMENTS: STECF notes that SGMED was unable to fully evaluate the exploitation status of the stock and therefore could not advise accordingly. STECF agrees with the GFCM-SAC Sub-Committee on Stock Assessment (SCSA) and with SGMED that the stock was estimated at its lowest stock size in 2006.

17.5. European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 16. Strait of Sicily

FISHERIES: In Sciacca port, the most important base port for the landings of small pelagic fish species along the southern Sicilian coast (GSA16), accounting for about 2/3 of total landings in GSA 16, two operational units (OU) are presently active, purse seiners and pelagic pair trawlers. The fleet in GSA16 is composed by about 50 units (17 purse seiners and 30 pelagic pair trawlers were counted up in a census carried out in December 2006). In both OUs, anchovy represents the main target species due to the higher market price.

Average anchovy landings over the last decade (1997-2008) were about 1,600 metric tons, with large inter-annual fluctuations. Total effort was slightly increasing over the same period.

It is worth noting that, though trend in biomass is clearly decreasing over recent years, landings levels over the same period were relatively high, indicating an increased vulnerability of the resource. Discards are estimated to be less than 5% of total catch for both the pelagic pair trawl and the purse seine fisheries. Effort data for pelagic trawling and purse seine are available for the port of Sciacca since 1998.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. From 2008 advice is also provided by SGMED. Census data for catch and effort data were obtained from census information (on deck interviews) in Sciacca port. Acoustic data were used for fish biomass evaluations. Biological sampling and the collection of catch and effort data were also performed. The studied area corresponds to the area extending on the continental shelf from the southern Sicily coast up to a depth of about 200 m. Time series of acoustic biomass estimates cover the period 1998 – 2008.

PRECAUTIONARY REFERENCE POINTS: SGMED 09-02 proposed E_{msy} (F/Z , F age range 0-3) = 0.4 as a proxy reference point for F_{msy} .

STOCK STATUS: Acoustic estimates of anchovy biomass ranged from a minimum of 6300 tons in 2006 to a maximum of 32000 tons in 2005. The acoustic survey biomass estimate for 2007 is 6700 t, quite similar to 2006. Biomass estimates of total population obtained by hydroacoustic surveys for anchovy in GSA 16 show a decreasing trend over recent years. The most recent estimate (2008) is the lowest value of the series and represents approximately just one-tenth of the maximum recorded value. However, in the absence of proposed or agreed biomass reference points, SGMED-09-02 is unable to fully evaluate the state of the stock with respect to biomass.

The high and increasing annual exploitation rates, as estimated by the ratio between total landings and biomass, indicates high fishing mortality levels. If this estimate of exploitation rate can be considered as equivalent to F/Z estimate obtained from the fitting of standard stock assessment models, the current exploitation (0.64) is higher than the reference point suggested by Patterson (1992) and SGMED 09-02. The fishing mortality level corresponding to $F/Z=0.64$ corresponding to a fishing mortality of $F=1.17$ assuming a natural mortality of $M=0.66$ as estimated using Pauly's (1980) empirical equation. Using the above assumptions and the proposed reference point of $F/Z = 0.4$, the stock appears to be overexploited.

RECENT MANAGEMENT ADVICE: Given the very low biomass for three consecutive years (2006, 2007 and 2008) and the current high exploitation rates, the SGMED WG 09-02 advised that fishing mortality should be reduced towards $F/Z = 0.4$ in order to promote stock recovery and avoid future loss in stock productivity and landings.

STECF COMMENTS: STECF endorses the SGMED 09-02 and GFCM-SAC advice that fishing mortality should be reduced towards $F/Z = 0.4$ in order to promote stock recovery and avoid future loss in stock productivity and landings.

STECF reiterates its previous recommendation that further research be undertaken to evaluate the impact of targeted fishing of larval stages of sardine (*bianchetto*) on the juvenile anchovy population.

17.6. European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 17. Northern Adriatic and Central Adriatic

FISHERIES: Anchovy, together with sardine, is one of the most important commercial species of the Adriatic Sea. The stock of anchovy living in the northern and central Adriatic Sea (GFCM-GSA 17) is shared between Italy, Slovenia and Croatia. The stocks are exploited by mid-water trawlers and purse seiners. In 2007, the Italian fleet was composed of about 130 (65 pairs) pelagic trawlers (*volante*) mainly operating from Trieste to Ancona (average GRT 43, average engine power 290 kW) and about 45 purse seiners attracting fish with light (*lampara*), operating in the Gulf of Trieste (24 small *lampara*, average GRT 9, average engine power 110 kW) and in the Central Adriatic (21 big *lampara*, average GRT 97, average engine power 390 kW). In 2007, the Slovenian fleet was composed of 1 pelagic trawler pair and 7 purse seiners; Croatian purse seine fleet is composed by 134 units with LOA greater than 15 meters. No data are available for purse seine boats with LOA lower/equal than 15 meters.

The main fraction of the total catch has been usually taken by the Italian fleet but, in recent years, the fraction relative to the fleets of the eastern part of the GSA17 has increased. Fisheries by boat seines and small trawlers targeting the transparent goby (*Aphia minuta*) as well as fries of small pelagic species are authorised for 60 days in wintertime in Italy. Italian regulations prohibit fishing with trawls and mid-water pair trawls for about 25/30 days between July and September. This closed season does not apply to purse seiners. Fishing activity is suspended during the weekend.

Anchovy landings for the whole area are about 43000 t per year (average of the last three years), with an increase in 2007. No information was given for 2008. The assessment is based on data time series up to 2007.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. From 2008 advice is also provided by SGMED. The present assessment of this stock has been carried out by means of VPA, tuned with echo-survey data. Catch and fishing effort data were collected for the period 1975-2007 along with biological data. Length frequency and age length data were combined to obtain annual catch-at-age series from 1975 onwards, which represented the basic input of VPA.

PRECAUTIONARY REFERENCE POINTS:

GFCM-SAC proposed a precautionary reference point based on the ratio $F/(F+M)$ not higher than 0.4 for this stock.

Based on its evaluation SGMED 09 02, proposed the following biological reference points for this stock.

Bpa (spawning stock) $\geq 80,000$ t	Proxy
Blim (spawning stock) $\geq 50,000$ t	Proxy
Elim (F/Z , F age range 0-3) ≤ 0.4	Proxy

STOCK STATUS: SGMED 09-02 has modified the assessment carried out last year in accordance with its recommendations regarding natural mortality to be applied (Murcia workshop of SGMED 09-01, 2-6 March 2009). No update with 2008 catch data was conducted. After a drastic decline the stock biomass reached its minimum in the late 1980s and recovered thereafter to about 130,000 t in 2007. The stock is considered to having its full reproductive capacity. SGMED 09-02 estimated recent recruitment to be at an average level (1976-2007).

SGMED 09-02 estimated the most recent exploitation rates in 2005-2007 as at or slightly below the proposed sustainable level. As such, the stock is considered sustainably harvested.

RECENT MANAGEMENT ADVICE: GFCM-SAC in 2008 assessment recommended that fishing effort should not be allowed to increase. It should be noted that small pelagic fishery in GSA 17 is multispecies and effort on sardine and anchovy should be considered together. SGMED 09-02 recommended to maintain the effort constant and to determine consistent catches. Technical interactions regarding the fisheries targeting the sardine stock in GSA 17 need to be taken into account when managing the anchovy fisheries. The possibility to include acoustic survey data carried out in the eastern part of GSA17 as a tuning fleet within the assessment should be explored.

SGMED 09-02 notes that there was no information presented during the meeting regarding the fry fishery within GSA17. The catches of fry fishery are believed to be negligible in this GSA by CNR-ISMAR-SPM Fish Population Dynamics Unit. Fry fishery may be more important in GSA18 and an ongoing EU funded project (SARDONE) will allow to evaluate if this fishery has an impact also on the stock in GSA17.

STECF COMMENTS: STECF endorses the advice of the SGMED 09-02 and GFCM-SAC.

17.7. European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 18. Southern Adriatic

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Purse seiners are the main fishing vessels targeting anchovy (and sardine) in GSA 18. During spring and summer seasons fishing is concentrated in the Central Adriatic where the highest catches can be obtained.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Stock biomass estimates are based on an acoustic survey carried out in the western part of GSA 18.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The GFCM-SAC classifies this stock as having Intermediate level of abundance.

RECENT MANAGEMENT ADVICE: Not to increase fishing effort.

STECF COMMENTS: STECF agrees with the advice of the SAC-GFCM Sub-Committee on Stock Assessment (SCSA). STECF notes that the data and information provided to the GFCM on anchovy in GSA 18 is very poor. STECF recommends that the area covered by the acoustic survey be extended to include the eastern part of GSA 18.

No assessment has been presented to GFCM-SAC Sub-Committee in 2008 and no other information was available to STECF for this stock.

17.8. European anchovy (*Engraulis encrasicolus*) in Geographical Sub Area 22. Aegean Sea

FISHERIES: In GSA 22 (Greek part) anchovy is almost exclusively exploited by the purse seine fleet. Pelagic trawls are banned and benthic trawls are allowed to fish small pelagics in percentages less than 5% of their total catch. Enforced regulations include a closed period from mid December till the end of February, and technical measures such as minimum distance from shore and gear restrictions. There is a minimum landing size of 9 cm.

Anchovy landings showed an increasing trend towards 2008. Reported landings showed an increasing trend since 2002, comprising 24,480 tons in 2008. Information regarding the age and length distribution of anchovy landings prior to 2003 is based on the Hellenic Centre of Marine Research data collection system.

Data of the fishing effort (Days at Sea) and the landings per vessel class indicate that small vessels (12-24 m) are mainly responsible for anchovy catches (>70% of anchovy catches). In 2008, the catches of the 12-24m vessels were 18,188 t and of the 24-40m vessels were 6,293 t. Discards are less than 1%.

The size of the Greek fleet in the Aegean Sea (GSA 22) ranged between 149 and 160 fishing vessels from 2000 to 2006. The main fishing ground for anchovy in GSA 22 is northern Aegean Sea.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. From 2008 advice is provided also by SGMED. The last assessment in SGMED 09 02 is based on fishery independent surveys information as well as on Integrated Catch at Age (ICA) analysis model. Specifically, acoustic surveys estimations were used for Total Biomass estimates and DEPM surveys for the estimation of SSB. The application of ICA was based on commercial catch data (2000-2008). Biomass estimates from acoustic surveys and the Daily Egg Production Method (DEPM) estimates over the period 2003-2008 were used as tuning indices.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points were proposed by GFCM-SAC for this stock.

SGMED proposed the following biological reference point for this stock:

$E_{lim} (F/Z, \text{age range } 1-3) \leq 0.4$	Proxy
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STOCK STATUS: The SGMED 09 02, noticed that survey indices and VPA analyses indicate that total biomass and SSB increased since 2005. Given the short length of the time series, SGMED is unable to precisely estimate the absolute levels of stock abundance and biomass. Biomass limit reference points have not been estimated for this stock, and hence advice relative to these cannot be provided by SGMED. ICA model estimates suggest an increase in recruitment since 2004, with a pronounced increase in 2008. However the model predicts a decrease in the population abundance at age 0 for 2009 to the 2006 abundance level.

Based on ICA results, the mean $E=F/Z$ (F averaged over ages 1 to 3) has fluctuated around 0.36 and since 2004 has been below the empirical level of sustainability suggested as target exploitation level for this stock. Thus, the stock is considered to be exploited sustainably.

RECENT MANAGEMENT ADVICE: Taking the empirical level as a reference point for sustainable exploitation, the stock is considered to be exploited sustainably. Increased fishing is not expected to result in increased landings in the long term. SGMED 09-02 recommends not to increase the effort and that short- and medium-term predictions of catch and stock biomass consistent with a range of effort changes should be provided.

Technical interactions regarding the fisheries targeting the sardine stock in GSA 22 need to be taken into account when managing the anchovy fisheries. For precautionary reasons the possibility of changing the closed period should be examined. Since the purse seine fishery is a multispecies fishery targeting both anchovy and sardine, a shift of the closed period (present: mid December to end of February) towards the recruitment period of anchovy (e.g. October to December) / or the recruitment period of sardine (e.g. February to April) could be suggested. This approach has the potential to improve the selectivity of the fishery, and thus provide higher potential catch in the long term.

STECF COMMENTS: STECF endorses the SGMED 09-02 advice not to increase effort. The alternative suggestions for a closed period will have different outcomes for each species and STECF highlights the need for further research concerning the definition of the closed period. STECF notes that there was no advice provided by GFCM-SAC in 2008.

17.9. Sardine (*Sardina pilchardus*) in Geographical Sub Area 1. Northern Alboran Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The purse seine fleet operating in GSA 01 Northern Alboran Sea is composed by 136 units, characterised by small vessels. 22% of them are smaller than 12 m, 78% between 12 and 24 m. The fleet has been continuously decreasing since eighties, from more than 230 vessels in 1980 to 136 in 2007.

Sardine and anchovy (*Engraulis encrasicolus*) are the main target species of the purse seine fleet in Northern Spain GSA01, but other species with lower economical importance are also captured, sometimes representing a high percentage of the capture: horse mackerel (*Trachurus* spp.), mackerel (*Scomber* spp.) and gilt sardine (*Sardinella aurita*).

The annual landings of sardine in the Northern Alborán Sea show a strong annual fluctuation for the last eighteen years ranged between 4000 and 11000 tons. Landings increase in 2007, reaching up 6770 t. Although the economical value of this species is lower than anchovy the high volume of catches makes it a valuable fishery.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. This assessment is based on both on VPA (XSA) methods and acoustic methods. In 2007 acoustic survey was not performed.

From 2008 advice is provide also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The GFCM-SAC classifies this stock as having intermediate abundance. The stock is fully exploited. A moderate fishing mortality has been observed.

SGMED estimated that both Total biomass in 2007 (TB=32,300 t) and Spawning Stock Biomass in 2007 (SSB=28,800 t) decreased since 2005, although the levels are still over the lowest SSB in the time series (in 2000). Recruitment levels in 2006 and 2007 are low relative to the rest of the time series (R=228 millions). Since 2000 fishing mortality (F1-3) has varied between 0.2 and 0.4, without any consistent trend (F=0.26).

RECENT MANAGEMENT ADVICE: Not to increase the fishing effort beyond the current levels. It should be noted that small pelagic fishery in GSA 01 is multispecies and effort on sardine and anchovy should be considered together.

SGMED recommends that fishing mortality should not be increased.

STECF COMMENTS: STECF agrees with the advice of the GFCM-SAC Sub-Committee on Stock Assessment (SCSA) and SGMED.

17.10. Sardine (*Sardina pilchardus*) in Geographical Sub Area 3. Southern Alboran Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The purse seine fleet operating in GSA 03 Southern Alboran Sea is composed of about 150 boats distributed in seven Mediterranean ports.

Sardine is the most important pelagic fish in the Mediterranean Moroccan waters with a mean yearly landing of 14,000 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is the GFCM-SAC. The evaluation of the state of the stock was based on LCA using VIT software. Data collected in 2007 were used.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Yield per recruit analysis indicates that the stock is fully exploited. Based on a preliminary assessment, considerable values of fishing mortality were observed for small individuals. Fishing effort is exercised mainly on adult individuals (17-19 cm).

RECENT MANAGEMENT ADVICE: Not to increase the current level of fishing effort.

STECF COMMENTS: STECF has no comments.

17.11. Sardine (*Sardina pilchardus*) in Geographical Sub Area 6. Northern Spain

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The purse seine fleet operate in GSA 06 Northern Spain is composed by 132 units: 4% are smaller than 12 m in length, 87% between 12 and 24 m and 9% bigger than 24 m. The fleet continuously decreased in the last twelve years, from more than 222 vessels in 1995 to 132 in 2007. This stronger reduction (41%) is possibly linked to a decreasing in anchovy catches.

Sardine and anchovy (*Engraulis encrasicolus*) are the main target species of the purse seine fleet in Northern Spain GSA06, but other species with lower economical importance are also captured, sometimes representing a high percentage of the capture: horse mackerel (*Trachurus spp.*), mackerel (*Scomber spp.*), and gilt sardine (*Sardinella aurita*).

The annual landings of sardine in the Northern Spain for the last eighteen years ranged between 19000 and 53000 tons. This species is the most fished one in GSA 06, both for pelagic and demersal species. Although its economical value is lower than anchovy the high volume of catches makes it a valuable fishery.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. This assessment is based on both on VPA (XSA) methods and acoustic methods. Both XSA and acoustics methods have the same perception of the state of the stock.

From 2008 advice is provide also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The GFCM-SAC classifies this stock as having intermediate abundance. The stock is fully exploited. A high fishing mortality has been observed.

SGMED estimated that SSB has decreased from 1994 to 2002 from about 80,000 t to about 40,000 t, and has subsequently increased to around 50,000 t in 2007. Recent recruitment in 2006 and 2007 has been estimated to be below average. Fishing mortality has declined from a high level in 1994 and 2001, to 2003, and has subsequently fluctuated around the 2003 level. F_{1-3} in 2007 = 0.83.

RECENT MANAGEMENT ADVICE: Not to increase the fishing effort beyond the current levels. It should be noted that small pelagic fishery in GSA 06 is multispecies and effort on sardine and anchovy should be considered together.

SGMED is not in a position to provide any advice for that stock.

STECF COMMENTS: STECF notes that SGMED was unable to fully evaluate the exploitation status of the stock and therefore unable to advise accordingly. STECF agrees with the assessment of the GFCM-SAC Sub-Committee on Stock Assessment (SCSA) but notes that in the absence of reference points no advice can be provided.

17.12. Sardine (*Sardina pilchardus*) in Geographical Sub Area 7. Gulf of Lions

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: In the Gulf of Lions, pelagic fisheries are targeting sardine and anchovy (*Engraulis encrasicolus*). A mean of 50 trawlers are targeting these pelagic species during the last years. There are also 14 purse seiners

operating in the south of the Gulf of Lions that catch these species. Some purse seine boats from Spain come in the area to fish mainly sardine. Fishing effort depends on market fluctuations. Landed catches in 2007 were 13000 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Data sources were time series of acoustic surveys, landings and CPUE. The acoustic surveys are performed at daytime in July. The acoustic assessment results are completed by an analysis of catches and fishing effort to improve the fisheries diagnoses.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The GFCM-SAC classifies this stock as having intermediate abundance. The biomass estimate shows a decrease from 83000 t in 2006 to 56000 t in 2007. First results of 2008 acoustic survey show a strong recruitment for sardine.

RECENT MANAGEMENT ADVICE: It is recommended not to increase the fishing effort, even if it appears a strong recruitment of sardine in 2008.

STECF COMMENTS: STECF agrees with the assessment of the GFCM-SAC Sub-Committee on Stock Assessment (SCSA) but notes that in the absence of reference points no advice can be provided.

17.13. Sardine (*Sardina pilchardus*) in Geographical Sub Area 16. Strait of Sicily

FISHERIES: In Sciacca port, the most important base port for the landings of small pelagic fish species along the southern Sicilian coast (GSA16), accounting for about 2/3 of total landings in GSA 16, two operational units (OU) are presently active, purse seiners and pelagic pair trawlers. The fleet in GSA16 is composed by about 50 units (17 purse seiners and 30 pelagic pair trawlers were counted up in a census carried out in December 2006). In both OUs, anchovy represents the main target species due to the higher market price.

Average sardine landings over the last decade (1997-2008) were about 1,500 metric tons, with a general decreasing trend. Total effort was slightly increasing over the same period.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008 management advice is given by SGMED. Census data for catch and effort data were obtained from census information (on deck interviews) in Sciacca port. Acoustic data were used for fish biomass evaluations.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock. In SGMED 09 02 the exploitation rate ≤ 0.4 was set as reference point for this stock.

E (F/Z, F age range 0-3) ≤ 0.4	Proxy
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STOCK STATUS (based on SGMED 09 02 assessment): Biomass estimates of the total population obtained by hydro-acoustic surveys for sardine in GSA 16 show that the recent stock level is well below the average value over the last decade. However, in the absence of proposed or agreed biomass reference points, SGMED-09-02 is unable to provide any scientific advice in relation to them.

Annual exploitation rates, as estimated by the ratio between total landings and biomass, indicated relatively low fishing mortality during the last decade. If this estimate of exploitation rate can be considered as equivalent to F/Z estimate obtained from the fitting of standard stock assessment models, the current exploitation rate (0.22) and even all the previous available estimates are lower than the reference point suggested by Patterson (1992) and confirmed by SGMED 09-02. Using the exploitation rate as a target reference point, the stock of sardine in GSA 16 is considered as being sustainably exploited.

RECENT MANAGEMENT ADVICE: Given that biomass was quite low for three consecutive years (2006, 2007 and 2008) and that the exploitation rate of sardine was occasionally moderate over the last decade, SGMED recommended the relevant fishing effort should not be allowed to increase in order to avoid future loss in stock productivity and landings. However, as the small pelagic fishery is generally multispecies, any enforcement about fishing effort for anchovy stock would also have effects on sardine. In addition, due to the low level of the anchovy stock, measures should be taken to prevent a shift of effort from anchovy to sardine.

The stock did not recover from the 2006 "collapse" in biomass (-52% from July 2005 to June 2006), and this fact, along with the moderate exploitation rates experienced over the last decade and the decreasing trend in landings, posed questions about the sustainability of current levels of fishing effort. Possible negative effects on these populations could result from pressure of other fishing gears on larval stages. A warning on the fishing of larval stages (locally named *bianchetto*) is relevant, taking into account that in the past years derogation of the fishing ban was normally operated in wintertime, i.e. during the sardine spawning season, even though more data and investigation are needed in order to estimate the possible impact of this fishing activity on the exploited populations.

STECF COMMENTS: STECF endorses the recommendations by SGMED 09-02 and GFCM-SAC not to increase the fishing effort in order to avoid future loss in stock productivity and landings.

STECF reiterates its previous recommendation that further research be undertaken to evaluate the impact of (*bianchetto*) fishery of sardine population.

17.14. Sardine (*Sardina pilchardus*) in Geographical Sub Area 17. Northern Adriatic and Central Adriatic

FISHERIES: Sardine, together with anchovy, is one of the most important commercial species of the Adriatic Sea. The stock of sardine living in the northern and central Adriatic Sea (GFCM-GSA 17) is shared between Italy, Slovenia and Croatia. The Adriatic small pelagic fleet is targeting both sardine and anchovy.

In 2007, the Italian fleet was composed of about 130 (65 pairs) pelagic trawlers (*volante*) mainly operating from Trieste to Ancona and about 45 purse seiners attracting fish with light (*lampara*), operating in the Gulf of Trieste and in the Central Adriatic. In 2007, the Slovenian fleet was composed of 1 pelagic trawler pair and 7 purse seiners. In 2008, the Croatian purse seine fleet was composed by 134 units with LOA greater than 15 meters. No data are available for purse seine boats with LOA lower/equal than 15 meters.

Fisheries by boat seines and small trawlers targeting the transparent goby (*Aphia minuta*) as well as fry of small pelagic species are authorised for 60 days in wintertime in Italy. Italian regulations prohibit fishing with trawls and mid-water pair trawls for about 25/30 days between July and September. This closed season does not apply to purse seiners. Fishing activity is suspended during the weekend.

No new landings data were provided in the SGMED 09 02. Sardine landings for the whole area were about 17,000 t per year (average of the last three years), with an increase in 2007. Due to low market price for sardine in Italy, discards of sardine at sea may occur. Between 1987 and 1999, discard estimates averaged about 2,000 t per year. No information on discards was available in the recent years, but it is reasonable to consider discards negligible, because of the decrease of catches.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Since 2008, advice is also provided by SGMED.

The assessment of this stock was carried out by means of Virtual Population Analysis (VPA), using catch data collected for Italy, Slovenia and Croatia, from 1975 to 2007. The Laurec-Shepherd tuning of VPA was performed using an abundance index series derived from echo-surveys carried out in the western part of the GSA17. In 2009, VPA was also carried out using vectors of natural mortality rate at age, i.e. not constant over age as in the stock assessment of 2008. They were derived from Probiom software and Gislason's method, according to the first SGMED meeting of 2009).

PRECAUTIONARY REFERENCE POINTS: GFCM-SAC proposed a precautionary reference point based on the ratio $F/(F+M)$ not higher than 0.4 for this stock.

SGMED proposed the following biological reference points for this stock.

B_{pa} (spawning stock)= 270,000 t	
B_{lim} (spawning stock= 180,000 t	
E_{lim} (F/Z , F age range 0-5) ≤ 0.4	Proxy

STOCK STATUS: According to GFCM-SAC 2008 assessment, the stock was over-exploited. The biomass estimated was about 90,000 t (average of the period 2005-2007) with a slight increase in 2007. The exploitation

rate ($F/F+M$) was higher than 0.4 in most recent years, while in 2007, it was estimated at 0.46, above the limit of 0.4 (precautionary reference point). The mean catch-biomass ratio of the last three years is 0.19, which is within the historically observed range (0.19-0.25). A low level of spawning biomass has been observed since 1999.

The most recent assessment has been done in SGMED 09-02, where the assessment carried in 2008 was modified in accordance with the recommendations of SGMED 09-01 workshop regarding the natural mortality. No update assessment with 2008 catch data was conducted. The average stock biomass estimated by VPA was 440,000 tonnes in 1975-2007 and 90,000 tonnes in 2005-2007. Spawning stock biomass showed the lowest levels in recent years. The stock status of sardine in GSA 17 was considered being far below its full reproductive capacity (in relation to Bpa and Blim). Since the mid 1990s, recruitment remained significantly below the average recruitment. SGMED 09-02 considers the stock of sardine to be over-exploited, as the estimated E almost continuously exceeds 0.4 since 1998.

RECENT MANAGEMENT ADVICE: The advice from the GFCM-SAC 2008 was that fishing effort should be reduced. It should be noted that small pelagic fishery in GSA 17 is multispecies and effort on sardine and anchovy should be considered together. GFCM-SAC specifically recommends to establish a closed season of at least 45 days.

SGMED 09-02 recommended recovering the stock biomass in order to increase stock productivity. Fishing mortality should be reduced until fishing mortality is below $F/Z=0.4$ in order to allow future recruitment contributing to stock recovery. In order to decrease the fishing mortality, SGMED 09-02 advised that fishing effort should be reduced by means of a multiannual management plan and that short- and medium-term predictions of catch and stock biomass consistent with a range of effort changes should be provided.

The management of the sardine fisheries in GSA 17 needs to account for multi-species effects, mainly the interaction with anchovy.

STECF COMMENTS: STECF endorses the advice of the SGMED 09-02 and agrees with GFCM-SAC that fishing mortality should be reduced until fishing mortality is below $F/Z=0.4$.

SGMED notes that there was no information presented during the meeting regarding the fry fishery within GSA17. The catches of fry fishery are believed to be negligible in this GSA by CNR-ISMAR-SPM Fish Population Dynamics Unit. Fry fishery may be more important in GSA18 and an ongoing EU funded project (SARDONE) will allow to evaluate if this fishery has an impact also on the stock in GSA17.

STECF notes that further research is needed to assess the impact of fry fishing on the sardine stock in GSA 17.

17.15. Sardine (*Sardina pilchardus*) in Geographical Sub Area 18. Southern Adriatic

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Purse seiners are the main fishing vessels targeting sardine (and anchovy) in GSA 18. During spring and summer seasons, fishing is concentrated in the Central Adriatic where the highest catches can be obtained.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. Stock biomass estimates are based on an acoustic survey carried out in the western part of GSA 18.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Unknown.

RECENT MANAGEMENT ADVICE: GFCM-SAC has not provided advice on this stock.

STECF COMMENTS: STECF has no comments.

17.16. Sardine (*Sardina pilchardus*) in Geographical Sub Area 22. Aegean Sea

FISHERIES: In GSA 22 (Greek part) sardine is almost exclusively exploited by the purse seine fleet. Pelagic trawls are banned and benthic trawls are allowed to fish small pelagics in percentages less than 5% of their total catch. Enforced regulations include a closed period from mid December till the end of February, and technical measures such as minimum distance from shore and gear restrictions. There is a minimum landing size of 11 cm.

Sardine landings showed high variability indicating a decreasing trend between 2005 and 2008, comprising approximately 9,700 tons in 2008. The purse seine fishery is considered a mixed fishery, where sardine, anchovy and other species are caught. Discards are <1% of the catches.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC. From 2008 advice is provided also by SGMED. The latest SGMED assessment was based on fishery independent surveys information as well as on Integrated Catch at Age (ICA) analysis model. Acoustic surveys estimations were used for Total Biomass estimates. The application of ICA was based on commercial catch data (2000-2008). Biomass estimates from acoustic surveys over the period 2003-2008 were used as tuning indices. Sardine data were comprised of annual sardine landings, annual sardine catch at age data (2000-2008), mean weights at age, maturity at age at age and the results of acoustic surveys.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points were proposed by GFCM-SAC for this stock. No reference points concerning biomass were suggested. F_{max} and $F_{0.1}$ are overestimated so precautionary the F_{pa} is suggested to be set as the fishing mortality that assures exploitation rate below the empirical level for stock decline ($E < 0.4$, Patterson 1992) for small pelagic.

$E_{lim} (F/Z, \text{age range } 1-3) \leq 0.4$	Proxy
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STOCK STATUS: The GFCM-SAC 2008 classified this stock as having intermediate level of abundance. There is uncertainty in order to consider the stock fully or over-exploited. High fishing mortality has been observed.

The results of the short time series of data do not allow concluding on reference points of B_{lim} or B_{pa} . In the absence of proposed or agreed biomass reference points, SGMED-09-02 is unable to fully evaluate the state of the stock and provide scientific advice. Results of the Integrated Catch at Age analysis indicated an increasing trend in total biomass and SSB showing a slight recovery of SSB to 20,000 t in 2008 from the low 2003-2004 estimates of 7,000 t. ICA model estimates showed above average recruitment since 2007, with a very high peak in 2008. Based on ICA results, the mean fishing mortality (averaged over ages 1 to 3) showed a clear decreasing trend, and has remained below 0.75 since 2004. The mean F/Z has declined from 2003 but remains above the suggested level of sustainability ($E \leq 0.4$) for this stock. Taking the empirical level as a reference point for sustainable exploitation, the stock is considered to be overexploited.

RECENT MANAGEMENT ADVICE:

Given the current high exploitation rates, SGMED recommended that fishing mortality should be reduced to $F/Z = 0.4$. In order to decrease the fishing mortality, SGMED 09-02 advised that fishing effort should be reduced by means of a multiannual management plan and that short- and medium-term predictions of catch and stock biomass consistent with a range of effort changes should be provided. The management of the sardine fisheries in GSA 22 needs to account for multi-species effects, mainly the interaction with anchovy.

For precautionary reasons the possibility of changing the closed period should be examined. Since the purse seine fishery is a multispecies fishery targeting both anchovy and sardine, a shift of the closed period (present: mid December to end of February) towards the recruitment period of anchovy (e.g. October to December) / or the recruitment period of sardine (e.g. February to April) could be suggested. This approach has the potential to improve the selectivity of the fishery, and thus provide higher potential catch in the long term.

STECF COMMENTS: STECF endorses the advice of the SGMED 09-02 to decrease fishing effort. STECF notes that the same fleet exploits both anchovy and sardine in GSA 22. The alternative suggestions for a closed period will have different outcomes for each species and STECF highlights the need for further research concerning the definition of the closed period. STECF notes that GFCM-SAC has not assessed the stock and not provided advice.

17.17. Sprat (*Sprattus sprattus*) in Geographical Sub Area 17. Northern Adriatic and Central Adriatic

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Sprat are fished by the same fleet targeting anchovy and sardine (see section of Anchovy in Geographical Sub-Area 17 for fleet description). Italian fleet discard sprats at sea, while Slovenian and Croatian land them. The level of catches is unknown.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Biomass estimation is based on acoustic survey.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The biomass estimate obtained by the 2005 acoustic survey is 21,000 t.

RECENT MANAGEMENT ADVICE: No specific advice is given by the SAC-GFCM Sub-Committee on Stock Assessment (SCSA).

STECF COMMENTS: STECF notes that the information presented on this stock and fishery is poor and in the absence of any reliable biological reference points, is unable to assess the status of the resource or its exploitation rate. Consequently, STECF is unable to advise on an appropriate exploitation rate for this stock. No assessment has been presented to SAC-GFCM Sub-Committee in 2008 and no other information was available to STECF for this stock.

17.18. Mackerel (*Scomber japonicus*) in Geographical Sub Area 3. Southern Alboran Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Fishing fleet is composed by 147 boats, distributed in seven Mediterranean ports, targeting small pelagics. The level of catches is unknown.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Data sources were acoustic surveys and landings.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The biomass estimate obtained by the acoustic survey performed in May 2006 is 3,000 t.

RECENT MANAGEMENT ADVICE: No specific advice is given by the SAC-GFCM Sub-Committee on Stock Assessment (SCSA).

STECF COMMENTS: STECF notes that the information presented on this stock and fishery is poor and in the absence of any reliable biological reference points, is unable to assess the status of the resource or its exploitation rate. Consequently, STECF is unable to advise on an appropriate exploitation rate for this stock.

No assessment has been presented to SAC-GFCM Sub-Committee in 2008 and no other information was available to STECF for this stock.

17.19. Horse mackerel (*Trachurus trachurus*) in Geographical Sub Area 3. Southern Alboran Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Fishing fleet is composed by 147 boats, distributed in seven Mediterranean ports, targeting small pelagics. The level of catches is unknown.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Data sources were acoustic surveys and landings.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The biomass estimate obtained by the acoustic survey performed in May 2006 is 71,000 t.

RECENT MANAGEMENT ADVICE: No specific advice is given by the SAC-GFCM Sub-Committee on Stock Assessment (SCSA).

STECF COMMENTS: STECF notes that the information presented on this stock and fishery is poor and in the absence of any reliable biological reference points, is unable to assess the status of the resource or its exploitation rate. Consequently, STECF is unable to advise on an appropriate exploitation rate for this stock.

No assessment has been presented to SAC-GFCM Sub-Committee in 2008 and no other information was available to STECF for this stock.

17.20. Striped mullet (*Mullus surmuletus*) in Geographical Sub Area 5. Balearic Islands

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Striped red mullet (*Mullus surmuletus*) is one of the most important target species in the trawl fishery developed by around 40 vessels off Mallorca (Balearic Islands, GFCM-GSA05). A fraction of the small-scale fleet (~100 boats) also directs to this species during the second semester of the year, using both trammel nets and gillnets. During the last decade, the annual landings of this species have oscillated between 73-117 and 17-29 tons in the trawl and small-scale fishery, respectively.

SOURCE OF MANAGEMENT ADVICE: The stock of *Mullus surmuletus* of the GFCM-GSA05 has been assessed using data from both the trawl and the small-scale fishery on a time series covering eight years (2000-2007). The assessment has been carried out applying tuned VPA (Extended Survivor Analysis, XSA) on the cohorts present during 2000-2007 and both VPA and Y/R analysis on a mean pseudo-cohort from that period. These approaches were performed using monthly size composition of catches, official landings and the biological parameters estimated within the framework of the Data Collection Programme (2003-2004).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The results indicate that the resource is fully exploited in the Balearic Islands. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion. Moderate fishing mortality and intermediate abundance were estimated. Current Y/R is very close to the maximum and B_{now} is about 33.5% of B_{virgin}.

RECENT MANAGEMENT ADVICE: No increase the fishing effort. In addition, the 2007 advice was to improve the trawl selectivity should be improved with the implementation of the 40 mm square mesh.

STECF COMMENTS: STECF agrees with the advice of the SAC-GFCM SCSA. The STECF SGMED-08-04 report should be considered.

17.21. Striped mullet (*Mullus surmuletus*) in Geographical Sub Areas 12, 13, 14. Northern Tunisia, Gulf of Hammamet, Gulf of Gabès

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Striped mullet is one of the two principal species of Mullidae exploited in Tunisia. The mean catches are over the 1950 t, representing 45% of the landings of this family and 3.6% of the production of demersal fishery. Striped mullet is fished all along the Tunisian coast, where many types of fleets (métiers) operate; the principal two are artisanal fishery and bottom trawl.

SOURCE OF MANAGEMENT ADVICE: Two independent stocks of red mullet in Tunisia were identified: one relative to the Northern and Eastern (GSAs 12 and 13) and the other to the Southern part (GSA 14). The two stocks were treated separately. Demographic analysis of *Mullus surmuletus* in Tunisia was made by means of length composition of capture applied to the inshore trawl fishing from 2003 to 2005. The analysis of pseudo-cohort method is used.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The global fishing mortality rates of the northern and eastern stocks are low; while for the southern stocks, they are moderate. The exploitation profile of north and east trawler and coastal fleet is orientated to mature fish; however, the southern trawlers catch mainly an important fraction of juveniles.

RECENT MANAGEMENT ADVICE: No assessment has been presented to SAC-GFCM Sub-Committee in 2008. The previous recommendation was not to increase the fishing effort.

STECF COMMENTS: STECF has no comments since there is not an updated assessment.

17.22. Red mullet (*Mullus barbatus*) in Geographical Sub Area 1. Northern Alboran Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Red mullets are of the most important target species for the trawl fisheries but are also caught with set gears, in particular trammel-nets and gillnets. From official data, the total trawl fleet of the geographical sub-area 01 (Northern Alboran Sea region) is composed by about 170 boats: on average, 42 TRB, 60 GT and 197 HP (in 2007). Smaller vessels operate almost exclusively on the continental shelf (targeted to red mullets, octopuses, hake and sea breams), bigger vessels operate almost exclusively on the continental slope (targeted to decapod crustaceans) and the rest can operate indistinctly on the continental shelf and slope fishing grounds. Red mullet is intensively exploited during its recruitment from August to November.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. The stock has been assessed using data from the trawl fishery on a time series covering three years (2005-2007). A VPA and a Y/R analysis on a mean pseudo-cohort from that period has been carried out using the VIT program (Leonart and Salat, 1997). The analysis was performed using monthly size composition of catches, official landings and the growth parameters according in the SGMED-08-03 meeting. The vector of natural mortality by age was calculated from Caddy's (1991) formula.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: In the Alboran Sea (GSA 1), the fishery is mostly concentrated on recruits. Moderately exploited: low level of fishing effort. Believed to have some limited potential for expansion in total production. Moderate fishing mortality and intermediate abundance were estimated in GFCM-SAC 2008. Current Y/R very close to the maximum and B_{now} being 21% of B_{virgin}. The results from the pseudocohort analysis show that the current stock biomass represents 21% of the virgin stock biomass (SG-MED 08 03). During STECF SGMED 08-04, the results of using SURBA analysis, didn't present good fitness for assessment.

RECENT MANAGEMENT ADVICE: The GFCM-SAC 2008 recommended not increasing the fishing effort. In addition GFCM SAC in 2007, advised:

- A more effective control in closed coastal areas in order to protect recruitment.
- Seasonal closures.
- A more strict control of the legal mesh size.
- To improve the selectivity by the use of 40 mm square mesh size in the cod-end.

STECF COMMENTS: STECF notes that in the absence of reference points the stock status cannot be fully evaluated and no advice can be provided.

17.23. Red mullet (*Mullus barbatus*) in Geographical Sub Area 3. Southern Alboran sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The trawler fleet targeting red mullet in GSA 3 consists of 120 trawlers. Trawler catches are landed mainly in three harbours: Nador (62.6%), Al Hoceima (23.2%) and M'diq (14.2%).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Assessments by structural models were performed using length frequencies data for 2007.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The stock of red mullet is qualified as overexploited with a fishing mortality which exceeds the optimum of about 30%.

RECENT MANAGEMENT ADVICE: The assessment was considered as preliminary and the GFCM-SAC 2008 didn't give any specific advice.

STECF COMMENTS: STECF has no comments.

17.24. Red mullet (*Mullus barbatus*) in Geographical Sub area 5. Balearic Island, Spain

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The two species of red mullet inhabiting the Mediterranean, *Mullus surmuletus* and *M. barbatus*, are present in the Balearic Sea. However, *M. surmuletus* predominates in this area where the species is targeted by both the artisanal and trawl fleet working along the continental shelf. On the contrary, *M. barbatus* is caught as a by-catch species by trawlers operating mainly on the deep shelf. In the Balearic Islands, *M. surmuletus* and *M. barbatus* represent about 80% and 20% of the total red mullet catches respectively. During the 2000-2007 period, the landings of *M. barbatus* from Mallorca have ranged between 10.5 and 27.8 tons.

SOURCE OF MANAGEMENT ADVICE: The stock of *Mullus barbatus* of the GSA05 has been assessed using data from the trawl fishery on a time series covering eight years (2000-2007). The assessment has been carried out applying tuned VPA (Extended Survivor Analysis, XSA) on the cohorts present during 2000-2007 and both VPA and Y/R analysis on a mean pseudo-cohort from that period. These approaches were performed using monthly size composition of catches, official landings and the growth parameters accorded in the SGMED-08-03 meeting. Other biological parameters (length-weight relationships, oögive of maturity) were obtained within the framework of the Spanish Data Collection Programme. The VPA was tuned with CPUE from bottom trawl surveys, carried out around the Balearic Sea during 2001-2007.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been proposed for this stock.

STOCK STATUS: The Current Y/R is very close to the maximum and B_{now} being 25% of B_{virgin}. XSA gave a more optimistic view on the stock. Fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion. Moderate fishing mortality.

RECENT MANAGEMENT ADVICE: SAC-GFCM Sub-Committee 2008:

Not to increase the fishing effort.

STECF COMMENTS: STECF notes that in the absence of reference points the stock status cannot be fully evaluated and no advice can be provided.

17.25. Red mullet (*Mullus barbatus*) in Geographical Sub area 6. Northern Spain

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Red mullet in GSA 6 (Northern Spain) is exploited by trawl and artisanal fisheries, although small gears (trammel nets and gillnets) account only for 5% of the total landings of these species. Landings of *M. barbatus* increased continuously from the earliest 1970's until 1998. From this year until 2006 a general decreasing trend with some fluctuations is observed. In the period 1998-2004 landings of this species averaged 1315 t per year. Estimated landings for the year 2007 are the highest in the data series. An important fraction (30% of individuals) of *M. barbatus* are under the minimum legal size.

The trawl fleet operating in this area is composed by 647 boats averaging 47 TRB, 58 GT and 297 HP. Trawl fisheries developed along the continental shelf and upper slope are multi-specific. Small vessels operate almost exclusively on the continental shelf targeting on red mullets, octopus, cuttlefish and sea breams. Medium and large vessels usually operate on the slope areas, but some of these units can also operate on the continental shelf (e.g. red mullet is more intensively exploited from September to November).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. The stock of *Mullus barbatus* in GSA06 has been assessed using data from the trawl fishery on a time series covering ten years (1998-2007). The assessment has been carried out applying tuned VPA (XSA) and Y/R analysis on the pseudo-cohort 1998-2007. The VPA was tuned with CPUE data from MEDITS and LEDER bottom trawl surveys and standardised fleet CPUE by applying GLM model. Size composition of trawl catches from IEO, and the Spanish national Data Collection program and official landings and fleet from fishermen association and Regional Governments.

From 2008 advice is provided also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points were proposed by GFCM-SAC for this stock.

Based on its evaluation of the STECF-SGMED, STECF proposes the following biological reference points for this stock.

F_{max} (Ages 1-3)=	0.24
$F_{0.1}$ (Ages 1-3)=	0.16

STOCK STATUS: GFCM-SAC estimated the stock to be overexploited. The fishery is being exploited at above a level, which is believed to be sustainable in the long term, with no potential room for further expansion and a higher risk of stock depletion/collapse. High fishing mortality and low abundance were observed.

SGMED estimated that since 1998 spawning stock biomass has been estimated to fluctuate around 600 tons. However, there is an estimated increase observed since 2006 with the highest value of 1200 tons in 2007. Recruitments in the last three years are just above the mean recruitment for the period 1998-2004. The fishing mortality for ages 0-2 has fluctuated without any obvious trend since 1998, around 0.9.

RECENT MANAGEMENT ADVICE: The SAC-GFCM Sub-Committee 2008 recommendations were (a) to improve trawl exploitation pattern by enforcing as soon as possible the current legislation (Council EC Regulation N° 1967/2006) regarding the use of the 40 mm square mesh in the cod-end and by more effective control in shelf areas above 50 m depth, and (b) to reduce the effective fishing effort, by reducing time at sea, from 5 to 4 days per week.

SGMED recommends the relevant fleet efforts to be reduced until fishing mortality is in the range of $F_{0.1}$ - F_{MAX} , in order to obtain high long term sustainable yields.

STECF COMMENTS: STECF endorses the advice of the SGMED 08-04 and GFCM-SAC recommendations that the relevant fleet efforts to be reduced until fishing mortality is in the range of $F_{0.1}$ - F_{MAX} , in order to obtain high long term sustainable yields. STECF also agrees with the GFCM-SAC 2008 concerning proposed technical measures. Alternative scenarios (closed areas and/or seasons) for improving yield should have been evaluated.

17.26. Red mullet (*Mullus barbatus*) in Geographical Sub Area 9. Ligurian and northern Tyrrhenian Sea

FISHERIES: *Mullus barbatus* is among the most commercially valuable species in the area. It is caught mainly with three different variants of the bottom trawl net. *Mullus barbatus* catches are higher during the post-recruitment period (from September to November). About 350 trawlers and a small number of artisanal vessels

exploit the species. Annual landings are around 700 t, mostly from trawlers. Catch is mainly composed by age 0 individuals while the older age classes are poorly represented in the catch. Illegal (undersized) catches of juveniles do occur.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2008 advice is provided also by SGMED. Data used derive from trawl surveys on size composition and abundance indices, and on landings by size/age and direct fishing effort from commercial catch assessment surveys. LCA with data from 2008 was used for the estimation of the F vector, using catches from trawlers and small scale fisheries. Yield per recruit analysis was used for the definition of F_{\max} and $F_{0.1}$. A dynamic Biomass Production model (ASPIC) using both a time series from 1994 and 2008 of catch and effort of commercial vessels proceeding from two of the main ports (Viareggio and Porto Santo Stefano) and an abundance index derived from trawl surveys for the same time interval allowed to estimate F_{MSY} , q for each fishery, B_{MSY} , f_{MSY} , and a value of F for each year along the time series. SURBA was also used for deriving F estimates by year and other features.

PRECAUTIONARY REFERENCE POINTS:

SGMED proposed the following biological reference points for this stock.

$F_{0.1}$ (all exploited ages) = 0.49	from Y/R
F_{\max} (all exploited ages) = 0.62	from Y/R
F_{msy} (all exploited ages) = 0.58	target, from catch and effort with ASPIC

STOCK STATUS (according to SGMED assessment): The index of stock abundance from GRUND survey shows high variability throughout the time series, but no trend is observed. The index of abundance from MEDITS survey that approximates a spawning stock biomass index (mostly represented by mature fish), suggests an increasing trend from 1994 to 2008. High inter-annual variation is observed from 2002 to 2008. The current spawning stock biomass roughly estimated through simulations with LCA outputs and yield-per-recruit analysis is assumed to be lower than 20% of the pristine SSB. A 20% spawner survival is considered too low to ensure stock self-renewal. Recruitment shows a slight increasing trend over 2002 -2008 and the increase is more pronounced in the most recent years.

Comparable estimates of the current fishing mortality were obtained with alternative approaches ($F_{2008} = 0.85$ with ASPIC, $F_{2006-2008}=0.97$ with LCA) all of them higher than the values recently estimated for the limit reference points $F_{\text{MSY}}=0.58$ and its proxy $F_{0.1}=0.49$. These were also higher than the values obtained with a previous biomass dynamics model based on trawl surveys time series of Z and biomass index, that provided a F_{MSY} rate of 0.59 (SGMED-08-03). The stock is considered to be overexploited in relation to F_{MSY} . The size of first capture is too low, resulting in growth overfishing. An increase in yield can be expected if fishing effort is reduced and/or more selective gears are used.

RECENT MANAGEMENT ADVICE: STECF endorses the advice of the SGMED 09-02. SGMED 09-02 proposed $F \leq 0.58$ as target management reference point (basis F_{MSY}). To achieve this, a multi-annual management plan taking into account mixed-fisheries effects should be established. Catches consistent with the effort reductions should be provided. It is advisable to avoid the illegal fishing within the 3 miles zone from the base line as well as the landing of undersized individuals in order to decrease fishing pressure on juveniles.

STECF COMMENTS: STECF endorses the advice from SGMED 09-02. STECF notes that there is no advice provided by GFCM-SAC.

17.27. Red mullet (*Mullus barbatus*) in Geographical Sub Area 10. Southern and central Tyrrhenian

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: *Mullus barbatus* is among the most commercial valuable species in the area and consists partly of a species assemblage that is the target of the bottom trawling fleets, which operate near shore. No commercial catch data and no information on the fleets were reported to the SAC.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Trawl survey data comes from MEDITS and SAMED EU projects. The data considered were the indices of abundance (weight and number per square km by swept area method), size composition at sea by sex, sex ratio, maturity, growth, natural and total mortality. The Length frequency analysis, Chen & Watanabe vector, Alagaraja formula, length converted catch curve, simulation of different scenarios using a dynamic pool model were performed.

From 2008 advice is provide also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points were proposed by GFCM-SAC for this stock.

Based on its evaluation of the STECF-SGMED, STECF proposes the following biological reference points for this stock.

$F_{0.1}$ (0-3 years)=	0.37-0.59
F_{max} (age range)=	Not well defined dome shaped curves
F_{msv} (age range)=	
F_{pa} (F_{lim}) (age range)=	
B_{msv} (spawning stock)=	
B_{pa} (B_{lim} , spawning stock)=	

STOCK STATUS: GFCM-SAC estimated the stock to be fully exploited and growth overfishing can be assumed for the species. There are no significant trends in biomass abundance estimates.

SGMED considered that in the absence of proposed or agreed references SGMED is unable to fully evaluate the state of the stock. Survey indices indicate a decreasing pattern of biomass from 1999 onwards. In the recent years (especially in 2007) a rising of stock number and biomass was observed but subject to high variation (uncertainty). The Aladym model shows that, except in the last two years, the SSB was at lower level compared to the beginning of the time series. A similar pattern shows also the spawning potential ratio that was varying around 10% between 1998 and 2005. Long-term scenario was also simulated. The recruitment of recent years since 2003 is indicated to be below average. Considering the level of F in 2006 i.e. 0.7, a reduction of 47% would be necessary to reach $F_{0.1}$ (0.37). In 2007 the situation seems changed. Despite the value of status quo F (0.65) is close to that of 2007, the exploitation pattern was different and thus a reduction of about 10% would be needed to reach $F_{0.1}$ (0.59). Given the results of the present analysis, the stock appears to be subject to overfishing.

RECENT MANAGEMENT ADVICE: SAC-GFCM consider that a reduced (total) mortality of 10% – 15% could be achieved by enforcing area and temporal closures currently in place, which, in turn, could lead to a more desirable ratio between average Spawning Stock Biomass and average virgin Spawning Stock Biomass (SSB/SSBo).

SGMED recommends fishing mortality to be reduced to the range between $F_{0.1}$ and F_{MSY} through effort reductions of the relevant fleets. This requires consideration of the mixed fisheries nature of such fleets.

STECF COMMENTS: STECF endorses the advice of the SGMED 08-04. STECF notes that there is no advice provided by GFCM-SAC.

17.28. Red mullet (*Mullus barbatus*) in Geographical Sub Area 11. Sardinian Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: *Mullus barbatus* is among the most commercially important species in the area and forms part of an assemblage that is the target of the bottom trawling fleets, which operate near shore. From 1994 to 2004, in GSA 11, the trawling-fleet has remarkably changed. The change has mostly consisted of a general increase of the number of vessels and by the replacement of the old, low tonnage wooden boats by larger steel boats. For the entire GSA a decrease of 20% for the smaller boats (<30 GRT), which principally exploit this species, was also observed.

SOURCE OF MANAGEMENT ADVICE: The data refer to trawl surveys carried out between 1994 and 2004. For the same years the commercial data was also analysed. Density and biomass indexes were used. Y/R

analysis was performed as a function of F and t_c . Assessment was performed considering both the whole GSA 11 and different zones with different exploitation levels.

PRECAUTIONARY REFERENCE POINTS: The analyses made using the Beverton & Holt model proved to be useful in identifying the value of F_{max} as Limit Reference Point. For a more cautious assessment, however, the value of F 0.1 seems to be a good Target Reference Point.

STOCK STATUS: The renovation of fishing vessels led to a great increase in the number of bigger boats (total gross tonnage, $TGT > 70$) and consequently a shift of the fishing effort towards deep resources: this favoured all the species living in shallow waters, such as red mullet. In Sardinian waters abundance and density indices of *Mullus barbatus* have markedly increased in the last years, particularly in the southern area where a significant trend is detected. Commercial catch rates and total landings have remained relatively constant since the mid 1990s. In general, the Sardinian red mullet stock does not seem to suffer from overexploitation: in the different zones, characterized by different trawling surfaces, wind exposition, bottom features and levels of exploitation, fishing mortality rates exceeded the estimated F_{max} only in some of the years analyzed.

RECENT MANAGEMENT ADVICE: Management actions such as the enforcement of a mesh size of 40 mm, a “seasonal fishing ban” on fishing activities and more active surveillance of Essential Fish Habitats (EFHs) could lead to a reduced mortality of the younger cohorts and help to safeguard juveniles. Protection areas play an additional important role in safeguarding recruits and juveniles from overexploitation.

STECF COMMENTS: STECF notes that no new assessment has been done since 2006 in GFCM-SAC. STECF has no comments.

17.29. Red mullet (*Mullus barbatus*) in Geographical Sub Area 17. Adriatic Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The fishery for red mullet is one of the most important in the GSA 17. Fishing grounds correspond to the distribution of the stock particularly within 100 m depth. The allocation of fishing effort depends on the different life cycles of this species and the different concentration and distribution in GSA 17.

The Italian catch of red mullet in GSA 17 is obtained mostly by demersal otter trawl, but other gears are participating at the fishery for a very minor fraction of the catch. Demersal trawl landings ranged between 77% to 98.6% in the years 2002-2007.

Catches in recent years were reported at a level of 3,098 t in 2002; 3,111 t in 2003; 3,884 in 2004; 3,696 in 2005 and 3,226 in 2006. In 2007, red mullet catches accounted for 3,425 t.

SOURCE OF MANAGEMENT ADVICE: From 2008 advice is provided by SGMED.

PRECAUTIONARY REFERENCE POINTS: Based on its evaluation of the STECF-SGMED, STECF proposes the following biological reference points for this stock.

$F_{0.1} = 0.50$	Average for the time interval 2006-2007, calculated using F not weighted on abundance for the length interval 9-20+ cm (age from 0 to 3+).
F_{max} (age range)=	
F_{msv} (age range)=	
F_{pa} (F_{lim}) (age range)=	
B_{msv} (spawning stock)=	
B_{pa} (B_{lim} , spawning stock)=	

STOCK STATUS: SGMED estimated that the average stock biomass in 2006-2007 was around 4000 tonnes. There is no information available on recruitment. The average F not weighted on abundance was 1.08 while the weighted average F was 0.62. The corresponding exploitation rates were 0.63 and 0.50, respectively. Given the values of F and F/Z (the latter one equal to or higher than 0.50) the stock can be considered to be sustainably exploited with some risk of overexploitation. According to Rochet and Trenkel (2003), it would be safe to avoid F/Z higher than 0.50. Also, the seasonality fishing mortality of red mullet (from September to November) has to be taken into account.

RECENT MANAGEMENT ADVICE: In order to reduce the risk of overfishing, SGMED recommends fishing mortality to be reduced through effort reductions of the relevant fleets. This requires consideration of the mixed fisheries nature of such fleets.

STECF COMMENTS STECF endorses the advice of the SGMED 08-04. STECF notes no advice was provided by GFCM-SAC.

17.30. Red mullet (*Mullus barbatus*) in Geographical Sub Area 19. Western Ionian Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: *Mullus barbatus* is among the species with high commercial value. The highest trawl fishing pressure occurs along the Calabrian coast while the presence of rocky bottoms on the shelf along the Apulian coast prevents the fishing by trawling in this sector. The landings in the 2004 in the whole GSA 19 were detected around 321 t coming mainly from bottom trawling and small-scale boats.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Systematic studies on this demersal resource come from national research programs (GRUND) and international trawl surveys (MEDITS), as well as Catch Assessment Surveys (CAMPBIOL) that include data collection of size/age structure of the catches. Density and biomass indexes, length frequency distributions, growth parameters, length converted catch curve analysis to estimate total mortality (Z), Pauly's formula for natural mortality (M) and yield-per-recruit analysis were used to assess the status of the stock in the area, as well as simulations of changes of t_c and F . Series data of abundance indexes, average length and total mortality rates from 1994 to 2004 were produced.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been proposed for this stock.

STOCK STATUS: *Mullus barbatus* shows a moderate status of overfishing evaluated by means of yield per recruit models. However, no significant decline in catch rates from experimental surveys can be detected.

RECENT MANAGEMENT ADVICE: Enforcement of the legal minimum mesh size in the trawl net and improved control of illegal fishing in very shallow waters during the recruitment period should be ensured. The closed season during the late summer-early autumn should be maintained in order to reduce the fishing mortality on the juveniles.

STECF COMMENTS: STECF notes that no new assessment has been done since 2006 in GFCM-SAC. STECF has no comments.

17.31. Red mullet (*Mullus barbatus*) in Geographical Sub Area 25. Cyprus

FISHERIES: Red mullet in GSA 25 is exploited by the bottom otter trawlers and the artisanal fleet using trammel nets. The average percentage of *M. barbatus* in the overall landings of the bottom trawl and artisanal fishery, for the period 2005-2008, was 7% and 2% respectively. Between 1985-2008 there was a declining trend in the landings from both gears, mostly from the trammel nets (total landings in 2007 were <40 t). LPUE of both fleets show a declining trend until 2006; since then, LPUE for the artisanal seems to be stable, while for the bottom trawl fishery LPUE in 2007 reached the highest value of the time period. It is noted that since 2006 the number of licensed bottom trawlers operating in GSA 25 has been reduced by 50% (from 8 to 4).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2009 advice is provided also by SGMED. The present assessment was performed by means of VPA analysis, using a mean pseudo-cohort from catch-at-age data for the period of 2005-2008. A Yield per Recruit (Y/R) Analysis was also performed for the estimation of F_{max} and $F_{0.1}$. The VIT software was used for both analyses. Catch-at-age data derived from landings for each fishing gear exploiting the stock (bottom otter trawl and trammel net), and discards data from bottom otter trawl. An M vector was used as estimated by PROBIOM. The biological data used were collected within the framework of the Cyprus National Data Collection Programme and submitted under the 2009 Spring Official EC Data Call.

PRECAUTIONARY REFERENCE POINTS:

Table of limit and target management reference points or levels proposed by SGMED:

$F_{0.1} (1-3)=$	0.22
$F_{max} (1-3)=$	0.34

STOCK STATUS (according to SGMED assessment): In the absence of proposed or agreed precautionary reference points, SGMED 09-02 was unable to fully evaluate the status of the spawning stock size. In the presented stock assessment no trend in the spawning stock biomass was evident. SGMED-09-02 was unable to provide any scientific advice of the state of the recruitment as no trend in recruitment was evident. The estimated reference points of $F_{0.1}$ (0.22) and F_{max} (0.34), in relation with the estimated value of $F_{bar (1-3)}$ (=0.84), suggested an overexploitation state of the stock.

RECENT MANAGEMENT ADVICE: SGMED 09-02 recommends a reduction in fishing effort of the relevant fleets until sustainable levels of fishing effort are achieved ($F \leq 0.22$). This should be done by means of a multi-annual management plan taking into account mixed fisheries implications. Short- and medium-term predictions of catch and stock biomass consistent with a range of effort changes should be provided.

STECF COMMENTS: STECF endorses the advice from SGMED 09-02. STECF notes that no advice has been provided by GFCM-SAC.

17.32. Hake (*Merluccius merluccius*) in Geographical Sub Area 1. Northern Alboran Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Hake (*Merluccius merluccius*) is one of the most important target species for the trawl fisheries. In the GSA 1 there are 140 trawlers landing around 400 tonnes by year, mainly composed by juveniles living on the continental shelf.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is GFCM-SAC but no new assessment was presented to subgroups of this committee in 2008.

From 2008 advice is provide also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: SGMED reported that transition analysis was made reducing the fishing effort by 20% and using 40 mm square mesh size. The results showed that the increase in Y/R was higher after improving the selectivity than reducing fishing effort. There were gains in the second year after the application of this management measure. The stock status was considered under a growth overexploitation. Current level of B is very low compared to B_0 .

SGMED could not estimate the absolute levels of stock abundance. Survey indices indicate the stock to vary without an overall trend, and in 2008 the stock SSB appears to be at an average level compared with the last 13 years. SGMED could not estimate the absolute levels of recruitment. Survey indices in 2008 indicate the recruitment level to be above the average of the available time series. SGMED cannot estimate recent or historic exploitation rates. No proposed or agreed reference points were available to SGMED to identify stock status.

The continued lack of older fish in the surveyed population indicates exploitation rates far beyond those considered consistent with high yields and low risk of fisheries collapse. However, SGMED note that the survey gear is not specifically designed to sample larger older fish.

RECENT MANAGEMENT ADVICE: The 2004 SAC WG noted that there are differences in the exploitation pattern in the different GSAs although the stock can be considered as one unit. The need for sensitivity analysis and for an update of the growth and mortality parameters was raised, as well as the need to monitor discards mainly in GSA 1 and in the future to move to non equilibrium assessments. Assessments including also trawl survey data were encouraged.

The GFCM recommended:

- to improve the selectivity: in comparison with the 40-mm diamond mesh size the use of 40-mm square mesh size is more effective and
- to control the effort on the main nursery areas.

The GFCM, taking into account that the stock was heavily overexploited and that the biomass was very low in comparison with the virgin one, highlighted the necessity of both improving the selectivity and reducing the fishing effort.

No new assessment has been presented in SAC-GFCM Sub-Committee on Stock Assessment (SCSA) in 2008. The first approach with SURBA analysis (MEDITS historical data base 1994-2007) has been developed and the assessment rejected. The results indicated that further investigation into the age structure estimated from the survey data is needed, as the model appears unable to fit to the data at present.

Given information available, SGMED could not provide projections of future stock status and catch possibilities.

STECF COMMENTS: STECF has no comments.

17.33. Hake (*Merluccius merluccius*) in Geographical Sub Area 5. Balearic Islands

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The trawl fishery off Mallorca (Balearic Islands; GSA05) is operated by around 40 vessels, which total annual landings are approximately 1400 tons. The European hake (*Merluccius merluccius*) is a target species for this fishery, mainly exploited on the deep shelf and upper slope, with annual landings oscillating between 50 and 190 tons during the last decades.

SOURCE OF MANAGEMENT ADVICE: The information used for the assessment of the stock consisted in annual size composition of catches, official landings biological parameters estimated from 2003-2007. The vector of natural mortality by age was calculated from Caddy's formula. The methodology applied was: (i) a tuned virtual population analysis (VPA), applying XSA method on the period 1980-2007 and considering catch per unit effort (CPUE) from commercial trawl fleet (2000-2007) and bottom trawl surveys (2001-2007) as tuning fleets; (ii) a surplus production model for the period 1940-2004, considering annual landings and engine power (HP) to estimate CPUE; and, (iii) a VPA and yield per recruit (Y/R) analysis on a mean pseudocohort from the periods 1980-89, 1990-99 and 2000-07.

From 2008 advice is provide also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock. The SAC-GFCM Sub-Committee on Stock Assessment (SCSA) recommended to prepare a list of reference points and indicators for the next WG.

STOCK STATUS: SAC-GFCM considered that the hake stock in GSA 05 is fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion. The fishing mortality was moderate and the abundance intermediate.

SGMED reviewed the assessment results, and considered them incompatible with true population dynamics.

SGMED therefore noted that the hake 'population' of GSA 05 is unlikely to be independent from that of the adjacent GSA 06. SGMED therefore recommends exploring the alternative of merging data from GSA 05 and GSA 06 and performing a single assessment for both GSAs together.

RECENT MANAGEMENT ADVICE: The SAC-GFCM Sub-Committee 2008 on Stock Assessment (SCSA) recommended not to increase the fishing effort and to enforce as soon as possible the replacement of 40 mm diamond mesh in the bottom trawl cod-end by 40 square mesh. It could improve the exploitation pattern of this species and reduce the discards.

SGMED was unable to provide management advice for this stock.

STECF COMMENTS: STECF notes that in the absence of reference points the exploitation status of the stock cannot be fully evaluated and advice cannot be provided. Based on its evaluation of the report of the STECF SGMED-08-04 Working Group, STECF considers that the 2008 assessment results are incompatible with true population dynamics.

STECF notes that the hake 'population' of GSA 05 is unlikely to be independent from that of the adjacent GSA 06 and recommends that a combined assessment for hake for GSA 05 and GSA 06 be explored.

17.34. Hake (*Merluccius merluccius*) in Geographical Sub Area 6. Northern Spain

FISHERIES: Exploitation is based on very young age classes, mainly 0 and 1 year old individuals, with immature fish dominating the landings. In 2003-2008 the annual landings of this species were around 3,500 tons. From official data, the total trawl fleet of GSA 06 is made up by 647 boats. The smaller vessels operate almost exclusively on the continental shelf, the bigger ones operate almost exclusively on the continental slope, while the remaining ones can fish indistinctly on the continental shelf and slope fishing grounds, depending on season, weather conditions, and economic factors.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2008 advice is also provided by SGMED. The state of exploitation was assessed for the period 1995-2008 by means of a VPA Separable, tuned with standardised CPUE from abundance indices from trawl surveys (MEDITS).

PRECAUTIONARY REFERENCE POINTS: SGMED proposed the following reference points: $B_{lim}=2,200$ t, $B_{pa}=4,000$ t, $F_{0.1}$ (age classes 0-2) = 0.16, and $F_{max} = 0.23$.

STOCK STATUS: The general results are similar to those obtained in previous assessments. Exploitation is based on very young age classes, mainly 0 and 1 year old individuals, with immature fraction dominating the landings. Since 2006, SSB has increased from historical lows and has varied slightly above average. SSB was estimated to around 1,500 t in 2008. Recruitment was low in recent years and decreased to the lowest level in 2008. Fishing mortality fluctuated without a trend. It was estimated at 1.6 (F_{bar}) for age classes 0-2 and 1.5 for age classes 2-4. Estimated $F_{0.1}$ and F_{max} were 0.16 and 0.23 respectively. SGMED notes that the SSB level is significantly below the proposed reference points and the F values are higher than the proposed $F_{0.1}$ and F_{max} , concluding that the stock is heavily over-exploited, with future catches being highly dependent on incoming recruitment.

RECENT MANAGEMENT ADVICE: SGMED recommends the fishing effort to be reduced until fishing mortality is below or at the proposed level $F_{0.1}$. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries effects. Short- and medium-term predictions of catch and stock biomass consistent with a range of effort changes should be provided. STECF notes that this advice is consistent with the advice provided by GFCM-SAC.

STECF COMMENTS: STECF recognizes that the hake stock in GSA 6 is overexploited and endorses the SGMED advice to reduce fishing mortality on age groups 0-2 towards $F_{0.16}$ to allow the spawning stock to rebuild. STECF also recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009.

17.35. Hake (*Merluccius merluccius*) in Geographical Sub Area 7. Gulf of Lions

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Hake (*Merluccius merluccius*) is one of the most important demersal target species of commercial fisheries in the Gulf of Lions (GFCM GSA 7). In this area, hake is exploited by French trawl, French gillnet, Spanish trawl and Spanish long-line. Around 250 boats are involved in the fishery. According to the official statistics the total annual landings for the period 1998-2007 have oscillated around a mean value of 2135 tons (1704 tons in 2007). Most fleets and catches correspond to French trawl (49 and 70%, respectively). Trawl catches range between 3 and 92 cm total length (TL), with an average size of 17-23 cm TL, followed by French gillnet (~32 and 15% respectively, ranging 13-86 cm TL and average size 38-41 cm TL), Spanish trawl (~12 and 8%, respectively, ranging 5-87 cm TL, and average size 20-29 cm TL), and Spanish long-line (~7 and 7%, respectively, ranging 23-96 cm TL and average size 46-62 cm TL).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. The information used for the assessment of the stock consisted in annual size composition of catches (estimated from monthly or quarterly sampling in the main landing ports), official landings and biological parameters estimated by Aldebert and Recasens (1996). The growth coefficient (k) comes from first results of tagging experiments developed by IFREMER in the area. The vector of natural mortality by age was calculated from Caddy's formula. For the period of the study (1998-2007), 2 methodologies were applied. The first one is a tuned virtual population

analysis (VPA), applying the Extended Survivor Analysis (XSA) method considering, as tuning fleets, catch per unit effort (CPUE) of commercial fisheries (French trawl, Spanish trawl and Spanish long-line) and French MEDITS survey indices. The second method is a length cohort analysis (LCA) and yield per recruit (Y/R) analysis on a mean pseudo-cohort from the period of study.

From 2008 advice is provide also by SGMED.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points were proposed by GFCM-SAC for this stock.

Based on its evaluation of the STECF-SGMED, STECF proposes the following biological reference points for this stock.

$F_{0.1}$ (age range) =	0.22
F_{max} (age range) =	n.a.
F_{msv} (age range)=	0.3
F_{pa} (F_{lim}) (age range)=	n.a.
B_{msv} (spawning stock)=	n.a.
B_{pa} (B_{lim} , spawning stock)=	n.a.

STOCK STATUS: GFCM-SAC estimated that fishing mortality high. There is growth overexploitation with a risk of recruitment overexploitation. A declining trend in recruitment was detected. Decreasing trend in average SSB and recruitment. The analysis shows that an acceptable reference point could be an F value of 0.6 (this means a reduction of 20% of current F value) which would allow to double the SSB/R.

SGMED estimated that since 1998 spawning stock biomass has varied without a trend and is estimated to amount 2300 tons in 2007. In the absence of proposed or agreed references SGMED is unable to fully evaluate the state of the stock. Since 2003 the estimated recruitment is below average. Fishing mortality of ages 0-2 has decreased in 2004 and has been stable around 0.7 since then. This level of fishing mortality exceeds proposed references of $F_{0.1}$ and F_{MSY} , and thus SGMED considers the stock being subject to overfishing.

RECENT MANAGEMENT ADVICE: The management advice by the SAC-GFCM Sub-Committee 2008 on Stock Assessment (SCSA):

To reduce growth overfishing and reduce the risk of recruitment overfishing,

This objective can be reached by:

- reducing the effort of trawlers, long-liners and gill-netters (reducing time at sea, number of fishing boats, engine power, Bollard pull and/or trawl size...).
- improving the fishing pattern of trawl so as to ensure that the minimum length of catches equal the minimum legal landing size, by: (i) Enforcing as soon as possible at least the 40 mm square mesh cod-end, and (ii) Closing nursery areas, at least temporally (possibly identified by trawl surveys), i.e. protecting spawning by closing areas (identified from VMS data particularly on gill-netters and long-liners), at least temporally during the period of maximum spawning (winter and spring).

SGMED recommends fishing mortality being reduced to the range of $F_{0.1}$ and F_{MSY} , through consistent effort reductions. This requires the mixed fisheries nature of the relevant fleets to be considered.

STECF COMMENTS: STECF endorses the advice of the SGMED 08-04.. STECF also agrees the recommendations the SAC-GFCM Sub-Committee on Stock Assessment (SCSA) concerning technical measures.

17.36. Hake (*Merluccius merluccius*) in Geographical Sub Area 9. Northern Tyrrhenian

FISHERIES: Hake is the demersal species providing the highest landings and incomes in GSA 09. About 90% of the landings come from bottom trawling; the remaining 10% being caught by artisanal vessels using gillnets. The fleet fishing capacity of GSA 09 has gradually decreased in the last 20 years, with a 30% reduction of the number of bottom trawlers from 1996 to 2006. In the last five years the total landings of hake fluctuated between 1,200 and 2,300 t, amounting to 1,329 t in 2008.

Due to the large concentration of juveniles in GSA 09, trawl landings are traditionally dominated by small sized specimens belonging to age groups 0+ and 1+. Gillnet fishery lands mostly age 2 and 3 fish. High quantities of small size hake are routinely discarded. Around 450 t. of hake discards were estimated in 2006 for the trawl fishery in GSA 09.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2008 advice is also provided by SGMED. Data coming from MEDITS (1994-2008) and GRUND (1994-2004) trawl surveys were used to estimate relative SSB and F with Surba. Data coming from DCR for the period 2006-2008 were used to run LCA analyses.

PRECAUTIONARY REFERENCE POINTS: The candidate reference points for long term sustainability proposed by SGMED were $F_{0.1} = 0.2$ and $F_{max} = 0.4$.

STOCK STATUS: SSB is estimated to be in the region of 5-10% of the SSB at F_{max} . SGMED underlines that this result could be biased by the observed exploitation patterns in surveys and fisheries, which almost exclusively cover the juvenile part of the stock. In recent years recruitment has varied without a clear trend. The estimated F is 1.2-1.7, far higher than the proposed reference points. SGMED concluded that the hake stock in GSA 9 appears to be heavily overexploited but due to the high productivity in terms of incoming year classes, it could have the potential to recover quickly if F is reduced towards $F_{0.1}$.

RECENT MANAGEMENT ADVICE: SGMED recommends the fishing effort to be reduced until fishing mortality is below or at the proposed level $F_{0.1}$. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries effects. Short- and medium-term predictions of catch and stock biomass consistent with a range of effort changes should be provided.

STECF COMMENTS: STECF recognizes the state of overexploitation of the hake stock in GSA 9 and endorses the recommendation of SGMED 09-02 and GFCM-SAC. STECF also recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009.

17.37. Hake (*Merluccius merluccius*) in Geographical Sub Area 10. Southern and Central Tyrrhenian Sea

FISHERIES: Landings of hake increased from 1,012 t in 2002 up to 1,544 t in 2006, and then decreased until to reach 1,122 t in 2008. The overall fishing effort decreased from 2002 up to date, especially for a reduction of small scale fishery.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2008 advice is also provided by SGMED. The state of exploitation was assessed for the period 1998-2008 by means of SURBA and ALADYM models and using data from trawl surveys as well as landing and effort data.

PRECAUTIONARY REFERENCE POINTS: SGMED proposed the following management reference point: $F_{0.1} \leq 0.24$

STOCK STATUS: SGMED was unable to advice on the state of the spawning stock size. However, considering that the F level estimated in 2008 (0.55) is higher than the reference $F_{0.1}$ and F_{max} values, SGMED concluded that the stock appears overfished and a reduction of 55% would be necessary to reach $F_{0.1}$ (0.24).

RECENT MANAGEMENT ADVICE: SGMED recommends the fishing effort to be reduced until fishing mortality is below or at the proposed $F_{0.1}$ level. This should be achieved by means of a multi-annual management plan which should take into account mixed-fisheries effects. Catches consistent with the effort reductions should be estimated.

STECF COMMENTS: STECF endorses the SGMED advice to reduce F towards $F_{0.1}$. STECF recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009. STECF notes that there is no advice provided by GFCM-SAC.

17.38. Hake (*Merluccius merluccius*) in Geographical Sub Area 11. Sardinian Sea

FISHERIES: Hake is exploited in all trawlable areas around Sardinia and is one of the most important target species for bottom trawlers. The catches of trammel nets or long-lines are negligible. Small hakes are commonly caught from 50 m up to 300 m depth, whereas adults are caught up to 800 m. Trawl fleet in 2006, accounted for

157 vessels (11.7% of the overall Sardinian fishing fleet). The total landings of hake strongly increased from 361 t in 2002 to 897 t in 2003, remained practically constant until 2006, and then decreased to 550 t in 2007.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2008 advice is also provided by SGMED. The SURBA software was used to analyse the MEDITS time series and to estimate relative SSB and F. DCR data of the years 2006-2007 were used to run stock analyses.

PRECAUTIONARY REFERENCE POINTS: The reference points $F_{0.1}$ and F_{max} estimated for this species by SGMED were 0.17 and 0.25, respectively.

STOCK STATUS: SGMED was not able to estimate the absolute levels of stock biomass and recruitment. SGMED notes that the current F ($F_{1-3}=1.0-2.3$) is far in excess of the proposed target reference point $F_{0.1}$ and also exceeds F_{max} , SGMED concludes that the stock is heavily overfished.

RECENT MANAGEMENT ADVICE: SGMED recommends the fishing effort to be reduced until fishing mortality is below or at the proposed level $F_{0.1}$. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries effects. Catches consistent with the effort reductions should be provided.

STECF COMMENTS: STECF endorses the SGMED advice. STECF recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009. STECF notes that there is no advice provided by GFCM-SAC.

17.39. Hake (*Merluccius merluccius*) in Geographical Sub Area 15 -16. Strait of Sicily

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: Although hake is not a target of a specific fishery, it is the third species in terms of biomass of Italian yield in the area. Hake is caught mostly by trawlers in a wide depth range (50-500m) together with other important species such as *Nephrops norvegicus*, *Parapenaeus longirostris*, *Eledone spp.*, *Illex coindetii*, *Todaropsis eblanae*, *Lophius spp.*, *Mullus spp.*, *Pagellus spp.*, *Zeus faber*, *Raja spp* among others. Italian trawlers, based in the harbours along the southern coasts of Sicily, operate both in GSA 15 and 16 with exclusion of Maltese Fishing Management Zone (MFMZ). Italian trawlers exert most of the fishing effort and get more than 99% of hake catches in the entire area.

In the late nineties Sicilian trawlers fishing off-shore (15–25 days of trip) had higher discard rates of hake (86% in number and 31% in weight) than the inshore trawlers (1-2 days trips) (32% in number and 9% in weight). More recent data showed that discarded fraction of undersized hakes by Sicilian trawlers decrease (13% in number and 3% in weight in 2006), amounting to about 54 tons in 2006. The trends in fishing effort of otter trawl fleet increased from 2004 to 2007 by 12%.

Hake is caught by Italian and Maltese fleets, by several gears, including demersal trawls, bottom longlines, polyvalent passive gears and others. Demersal trawlers account for the large majority of the catches, ranging between 91.6% to 98.9% in the years 2002-2007.

Catches of hake in recent years were reported at a level of 1,873 t in 2002; 2,013 t in 2003; 1,949 in 2004; 1,796 in 2005 and 1,632 in 2006. In 2007, hake catches accounted for 1,728 t.

SOURCE OF MANAGEMENT ADVICE: In 2008 advice is provided by SGMED and GFCM-SAC.

PRECAUTIONARY REFERENCE POINTS: Based on its evaluation of the STECF-SGMED, STECF proposes the following biological reference points for this stock.

$F_{0.1}$ (1-4)= 0.16	Females;(TRP)
F_{max} (1-4)= 0.25	Females; (LRP)
F_{msy} (age range)= not available	
F_{pa} (Flim) (age range)= not available	
B_{msy} (spawning stock)= not available	
F_{mbp} (1-4)=0.39	Sex combined; (LRP)
Z_{mbp} (1-4)= 0.87	Sex combined; (LRP)

STOCK STATUS: SGMED estimated that relative indices derived from scientific surveys indicate a recent decrease in the stock size in both GSAs since 2005. In 2007, the stock spawning stock size in weight (only GSA 16) amounted to 136% as compared to the long term average (1994-2006). However analytical assessments (Aladym Model) evaluated the spawning stock to be very low when compared with estimated virgin biomass, implying negative effects on stock productivity. Medits results indicate the level of recent recruitment to be increased significantly. The average fishing mortality of hake in GSA 15 and 16 over ages older than 4 could not be precisely assessed. Trends in the average fishing mortality over ages 1 to 4 derived from scientific surveys indicate a recent increase in the exploitation rate since 2003. No relevant differences in F between GSA 15 and 16 are evident. The continued low abundance of adult fish in the surveyed population and catches indicate a very high exploitation pattern far in excess of any fishing mortality consistent with high yields and low risk of fisheries collapse. Considering more in detail the GSA 16, for which both commercial and trawl surveys data are available, all the stock assessments performed during the SGMED suggest quite similar diagnosis of overfishing.

RECENT MANAGEMENT ADVICE: SGMED recommends developing and implementing a management plan to continuously reduce current F through consistent effort reductions and catch estimations.

STECF COMMENTS: STECF endorses the advice of the SGMED 08-04 and agrees with the advice provided by GFCM-SAC.

17.40. Hake (*Merluccius merluccius*) in Geographical Sub Area 17 Adriatic sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The Italian catch of Hake in GSA 17 is obtained mostly by demersal otter trawl, but other gears are participating at the fishery for a very minor fraction of the catch. Demersal trawlers account for the large majority of the catches, ranging between 88.7% to 95.8% in the years 2002-2007.

Catches of hake in recent years were reported at a level of 2,637 t in 2002; 2,606 t in 2003; 3,045 in 2004; 3,609 in 2005 and 4,395 in 2006. In 2007, hake catches accounted for 3,764 t.

SOURCE OF MANAGEMENT: From 2008 advice is provided by SGMED.

PRECAUTIONARY REFERENCE POINTS: Based on its evaluation of the STECF-SGMED, STECF proposes the following biological reference points for this stock.

$F_{0.1} = 0.22$	Average for the time interval 2006-2007, calculated using F not weighted on abundance for the length interval 9-39+ cm (age from 0 to 4+).
$F_{max} \text{ (age range)=}$	
$F_{msv} \text{ (age range)=}$	
$F_{pa} (F_{lim}) \text{ (age range)=}$	
$B_{msv} \text{ (spawning stock)=}$	
$B_{pa} (B_{lim}, \text{ spawning stock)=}$	

STOCK STATUS: SGMED estimated that the average stock biomass estimated by LCA in 2006-2007 was around 4,000 tonnes. Without any biomass reference proposed or agreed, SGMED is unable to fully evaluate the state of the stock size. There are no information available on recruitment. The recent average F not weighted on abundance was 1.22 while the weighted average F was 0.50. Given the values of F and F/Z (the latter one higher than 0.50), the stock of hake can be considered to be at least fully exploited. According to Mertz and Myers (1998), $F/Z = 0.80$ represents the maximum value which a demersal stock may endure, and the highest estimated value of F/Z (that based on unweighted F) was just slightly lower than 0.80. According to Rochet and Trenkel (2003), it would be safe to avoid F/Z higher than 0.50: the estimated value of F/Z based on weighted F was slightly lower than 0.60. Thus, a risk of overexploitation is real for hake in the GSA 17. Finally, a meaningful percentage of caught hake has a length below the values of sexual maturity: this is a further reason for caution in managing this stock.

RECENT MANAGEMENT ADVICE: In order to avoid the indicated risk of overexploitation for hake in GSA 17 SGMED recommends effort reductions of the relevant fleets to be considered. Effort reductions would

require mixed fisheries considerations. A significant percentage of caught hake has a length below the values of sexual maturity: this is a further reason for caution in managing this stock.

STECF COMMENTS: STECF endorses the advice of the SGMED 08-04. STECF notes that there is no advice provided by GFCM-SAC.

17.41. Hake (*Merluccius merluccius*) in Geographical Sub Area 18. Southern Adriatic Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: *Merluccius merluccius* is one of the most important species in the Geographical Sub Area 18 representing more than 20% of landings from trawlers. Trawling represents the most important fishery activity in the southern Adriatic Sea and a yearly catch of around 30,000 tonnes could be estimated for the last decades. Demersal species catches are landed on the western side (Italian coast) and the eastern side (Albanian coast), with an approximate percentage of 97% and 3%, respectively. Trawling is the most important fishery activity on the whole area (\approx n° 900 boats, 60% of total number of fishing vessels; 85% of gross tonnage). The Mediterranean hake is also caught by off-shore bottom long-lines, but these gears are utilised by a low number of boats (less than 5% of the whole South-western Adriatic fleet).

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Data sources were trawl-surveys (national and MEDITS programmes) as well as Catch Assessment Surveys that included data collection of size structure of the catches.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been proposed for this stock.

STOCK STATUS: The trend of abundance indices highlighted a decrease from 1996 to 2003, while a slight increase was reported for 2004 and 2005. Most of the assessment carried out previously in the basin using data from trawl surveys and analytical methods underlined an overexploitation of the stock although no clear trend in Z values has been reported. The decreasing trend of index of relative biomass of the hake appeared mostly related to the adult fraction of the population, while the recruitment consistence seemed to be quite stable. Some possible causes of such a decrease could be linked to the fishing mortality exerted on large individuals by bottom long-liners and/or the increase of demersal fishing effort in the eastern Adriatic sector since 1990.

STECF COMMENTS: The STECF notes that no new assessment has been presented to the SAC-GFCM Sub-Committee on Stock Assessment (SCSA) since 2006.

17.42. Hake (*Merluccius merluccius*) in Geographical Sub Area 19. Western Ionian Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: *Merluccius merluccius* is one of the most important species in the GSA 19, considering both the amount of catch and the commercial value. It is fished with different strategies and gears (bottom trawling and long-line). In the year 2004 the landings in the Ionian area were detected around 850 tonnes (IREPA data). The main fisheries operating in GSA 19 are Gallipoli, Taranto, Schiavonea and Crotone. The fishing pressure varies between fisheries and fishing grounds.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Systematic studies on this demersal resource come from national research programs (GRUND) and international trawl surveys (MEDITS), as well as from Catch Assessment Surveys (CAMPBIOL) that include data collection of size/age structure of the catches. Density and biomass indexes, length frequency distributions, growth parameters, length converted catch curve analysis to estimate total mortality (Z), Pauly's formula for natural mortality (M) and yield-per-recruit analysis were used to assess the status of the stock in the area as well as

simulations of changes of t_c and F . Data series of abundance indexes, average length and total mortality rates from 1994 to 2004 were produced.

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been proposed for this stock.

STOCK STATUS: Although yield per recruit models showed an overexploitation condition, since the bulk of the catches were made up of juveniles, no significant trend of reduction in the catches was observed. Indeed, the trawl net does not catch adequately the adult fraction of the stock which, instead, is mostly captured by long-line.

RECENT MANAGEMENT ADVICE: The reduction of fishing mortality could be obtained by adopting the reduction of fishing activity in the nursery areas distributed along the Ionian Sea. In this respect, “no-take zones” (ZTB) should be adopted in the GSA 19.

STECF COMMENTS: The STECF points out that no new assessment has been presented to the SAC-GFCM Sub-Committee on Stock Assessment (SCSA) since 2006.

17.43. Sole (*Solea solea*) in Geographical Sub Area 17. Northern and Middle Adriatic

FISHERIES: Sole (*Solea solea*) is one of most important target species of rapido trawl and set net fleets in GSA 17. The stock is shared between the Adriatic countries (Italy, Croatia and Slovenia). The Italian fleets exploit this resource with rapido trawl and set nets (gill nets and trammel nets), while only trammel net is used in the countries of the eastern coast. More than 90% of the catches come from the Italian side.

Landings fluctuated between 1,000 and 2,300 t in the period 1996-2006 (data source: FAO-FishStat and IREPA-SISTAN time series). The fishing effort applied by the Italian rapido trawlers gradually increased from 1996 to 2005, and slightly decreased in the last years.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2009 advice is provided also by SGMED. This assessment (SGMED) is based on VPA (XSA) methods. A separable VPA was also run as exploratory analysis for this stock. In addition, a yield-per-recruit (Y/R) analysis was carried out. The stock was also assessed by SURBA method. Both XSA and SURBA gave the same perception of the state of the stock.

PRECAUTIONARY REFERENCE POINTS: SGMED proposed the following reference points for sustainable exploitation related to high long term yield: $F_{0.1}$ (ages 0-4) ≤ 0.26 and $F_{\max} = 0.46$

STOCK STATUS: After the minimum value observed in 2005 (c. 230 t) the SSB was constant in 2006 and 2007 and increased in 2008 to about 260t. Recruitment varied without any trend in the years 2005-2008, reaching a minimum in 2006. The value estimated in 2008 was similar to that of 2007. Exploitation decreased from 2005 to 2006, was constant in 2006-2007 and increased in 2008. The most recent estimate of fishing mortality (F_{0-4}) is $F=1.35$. With $F_{0.1}=0.26$ and $F_{\max}=0.46$, the stock is considered being subject to overexploitation.

RECENT MANAGEMENT ADVICE: SGMED recommends the fishing effort to be reduced until fishing mortality is below or at the proposed level $F_{0.1}$. This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries effects. Short- and medium-term predictions of catch and stock biomass consistent with a range of effort changes should be provided.

A reduction of *rapido* trawling fishing pressure would be especially recommended, taking into account that the catches of this gear are mainly based on juveniles. Recruitment success appears to be highly related to environmental conditions in the Adriatic and fishing effort by the Rapido trawl fishery compromises recruitment success particularly in years when environmental conditions are unfavourable. An additional two-months closure for *rapido* trawling inside 11km offshore along the Italian coast, after the biological fishing ban (August), would be also advisable to reduce the portion of 0-group sole in the catches.

For the same reason, specific studies on *rapido* trawl selectivity are necessary. In fact, there is some evidence that the adoption of a larger mesh size would not result in an increase in the selectivity of this gear for sole. The effect of square mesh on the selectivity on in the Adriatic for Rapido trawlers is unknown.

The main winter spawning area for sole extends from the eastern coast to the centre of the Adriatic Sea. A closure of this area during the spawning season is likely to offer much needed protection of the existing spawning stock in order to allow the SSB to rebuild.

Finally, a set of specific management rules for *rapido* trawl fishery would be advisable (e.g.: size and number of gears, mesh size, towing speed).

STECF COMMENTS: STECF endorses the advice from SGMED and agrees with the advice provided by GFCM-SAC. STECF supports the recommendation that the impact of rapido trawlers on juvenile sole be taken into account in the development of the Italian management plan. Since the rapido trawlers prosecute a mixed fishery, other species -specific measures will also need to be considered.

STECF recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009.

17.44. Monkfish (*Lophius budegassa*) in Geographical Sub Area 6. Northern Spain

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The monkfish *Lophius budegassa* is one of the two species of anglerfish captured as by-catch by the Mediterranean trawl fleets exploiting from the coast to the continental shelf edge. In spite of the fact that catches are scarce, this species is very important for its economic value. The small size individuals are usually included in the "mixed" commercial categories, so making difficult to collect data to obtain a realistic knowledge of the current exploitation level of this species.

SOURCE OF MANAGEMENT ADVICE: A preliminary stock assessment of monkfish was carried out in 2007 based on landings data (1996-2006) of trawl fishery on the Southwest of the Mediterranean Sea (GSA06, Santa Pola port). The assessment is an improvement of the previous one as data on mixed-species categories in landings were available. Natural mortality vector was estimated by PROBIOM Excel spreadsheet (Caddy and Abella, 1999).

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: The natural mortality is estimated to be slightly higher than the Fishing mortality. The highest fishing mortality is on the oldest age classes. The stock is considered to be fully exploited at a precautionary level.

RECENT MANAGEMENT ADVICE: The SAC-GFCM Sub-Committee on Stock Assessment (SCSA) made no specific comments regarding this preliminary stock assessment of monkfish (*Lophius budegassa*), but pointed out that these results must be considered with caution, because the data come from a year and one port, and the smaller individuals are still slightly underestimated.

STECF COMMENTS: STECF notes that in the absence of reference points the exploitation status of the stock cannot be fully evaluated and no advice can be provided.

17.45. Common Dentex (*Dentex dentex*) in Geographical Sub Areas 12, 13. Tunisian coasts.

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: *Dentex dentex* is exploited in the Tunisian coasts by artisanal gears, especially the long-lines and the trammel-nets. Two separate stocks are assessed according to regions: the Northern and the Eastern coasts.

SOURCE OF MANAGEMENT ADVICE: The latest assessments were conducted in 2007 on data collected in 2004.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: In the North (GSA 12), the yield by recruit value is below the optimal level; the stock seems to be underexploited. The exploitation profile in the eastern region (GSA 13) is in optimal conditions.

RECENT MANAGEMENT ADVICE: The SAC-GFCM Sub-Committee on Stock Assessment (SCSA) recommended as a precautionary measure not to increase the fishing effort in both areas. In the future, a more detailed description of the fishery should be provided to facilitate the management advice.

STECF COMMENTS: STECF notes that in the absence of reference points the exploitation status of the stock cannot be fully evaluated and no advice can be provided.

17.46. Norway Lobster (*Nephrops norvegicus*) in GSA 05 - Balearic Island

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: This species is one of the target species of the bottom trawl fishery developed off Mallorca by a fleet of around 40 vessels, being captured on the upper slope, between 350 and 600 m depth, jointly with other bycatch species such as *Merluccius merluccius*, *Lepidorhombus* spp., *Micromesistius poutassou* and *Lophius* spp. Annual landings from 1986 to 2007 fluctuated between 3 and 20 t. In the years 2002-2007 the average annual catch was 9.4 tons (3.3 t of females and 6.1 t of males).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this species in the Mediterranean Sea.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. A preliminary assessment of this stock has been carried out by means of VPA and yield-per-recruit (Y/R).

STOCK STATUS: Although the species seems to be "moderately exploited" and it could have some limited potential for expansion in total production, as a precautionary measure it should be considered as fully exploited. The fishery is operating at or close to an optimal yield level, with no expected room for further expansion.

RECENT MANAGEMENT ADVICE: Although this is only a preliminary stock assessment, SAC-GFCM Sub-Committee on Stock Assessment (SCSA) advises to not increase the fishing effort and to enforce the replacement of 40-mm diamond mesh in the bottom trawl cod-end by 40-mm square mesh.

STECF COMMENTS: STECF notes that in the absence of reference points the exploitation status of the stock cannot be fully evaluated and no advice can be provided.

17.47. Norway lobster (*Nephrops norvegicus*) in Geographical Sub Area 9. Ligurian and northern Tyrrhenian

FISHERIES: *Nephrops norvegicus* is one of the most important commercial species in GSA 9. All landings are due to bottom trawl vessels exploiting slope muddy bottoms mainly between 300 and 500 m depth. About 100 vessels exploit the species in the area. In the last five years the total landings of Norway lobster of GSA 09 fluctuated between 248 (2005) to 228 tons (2008). The catch is mainly composed by adult individuals over the size-at-maturity. Discarding of specimens under MLS (20 mm CL) is negligible.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Since 2009, advice has also been provided by SGMED. Data coming from MEDITS (1994-2008) and GRUND (1994-2006) trawl surveys were used to estimate relative SSB and F with Surba. DCR data (size distribution of trawl landings 2006-2008) were used to estimate F at age and absolute abundance at age with VIT (LCA analysis).

PRECAUTIONARY REFERENCE POINTS: The reference points, $F_{0.1}$ and F_{max} , estimated for this species using the Yield software were 0.21 and 0.36 (median values), respectively.

STOCK STATUS:

SGMED-09-02 could not fully evaluate the state of the SSB due to the lack of precautionary management reference points. Relative spawning stock biomass (SSB) indices derived from trawl surveys showed a fluctuating trend. An increase in SSB occurred in recent years (2005-08). Recruitment (age groups 1+ and 2+) shows a significant increasing trend since 1994 (3-4 fold).

Recent values of F_{3-7} obtained from commercial data were: 0.32 (2006), 0.30 (2007), and 0.36 (2008). Similar F_{3-7} values were obtained from trawl survey data using Surba (0.36 in 2006 and 0.33 in 2007), indicating that the stock is currently fully exploited or lightly overexploited.

RECENT MANAGEMENT ADVICE: SGMED recommended to reduce specific effort until fishing mortality is below or at the proposed $F_{0.1}$ level (0.21). This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries effects.

STECF COMMENTS: STECF endorses the SGMED advice. STECF recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009. STECF notes that no advice was provided by GFCM-SAC.

17.48. Blue and Red Shrimp (*Aristeus antennatus*) in Geographical Sub Area 5. Balearic Islands

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The red shrimp is one of the most important resources for bottom trawling in the Balearic Islands. It is fished on the slope between 400 and 800 m depth. In biomass, it represents an average of 5% of the overall catches, but its economic value is 30% of the total earnings of the fishery. Updated information on landings and effort collected on annual basis (1992-2007) show that throughout the late 1990s, landings decreased to a minimum value of 100 t. During early 1990s and from 2000s they fluctuated between 200 and 250 t. Females dominate in the landings, nearly 70-80% of the total.

The present trawl fleet includes 46 vessels, about 50% of the fleet fish regularly on the slope. Total discards was estimated to 33% of reported landings in 2005 (DCR discards data assessment). Discards for the target species (red shrimp) are considered null (below 0.001%).

The number of red shrimp vessels for the whole GSA 05 has been decreased steadily from the early 1990s.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. A VPA based assessment was conducted using catch information, length frequency data for landings, information on fishing effort and survey data.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed.

STOCK STATUS: Recruitment has fluctuated without any trend since from 1992 to 2004. For the recent years (2004-2007) recruitment has shown a decreasing trend.

F has fluctuated between 0.8 and 0.3 from the whole time series, with a decreasing trend until 2004, after which it remained fairly stable around 0.4-0.5.

Total Biomass (TB) has fluctuated with peaks in the beginning of the time series, in the early 2000s and in 2005. The present average biomass represents 52% of the virgin biomass.

RECENT MANAGEMENT ADVICE: The SAC-GFCM Sub-Committee on Stock Assessment (SCSA) recommends not increasing fishing effort.

STECF COMMENTS: STECF notes that in the absence of reference points the exploitation status of the stock cannot be fully evaluated and no advice can be provided.

17.49. Blue and Red Shrimp (*Aristeus antennatus*) in Geographical Sub Area 6. Northern Spain

FISHERIES: The red shrimp is one of the most important resources of bottom trawling in GSA 6. It is fished on the slope between depths of 400 to 800 m and is targeted by a specific trawl fleet. In 2002-2008 landings fluctuated between 300 and 650 t, with an average of around 500 t. Females dominate in the landings, accounting for nearly 80% of the total. Discards of the red shrimp are null. Fishing effort was reduced from 20,000 days in 2002 to 9,000 in 2006, with an increase thereafter, reaching 23,000 days in 2008.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2009 advice is also provided by SGMED. The state of exploitation was assessed for the period 2002-2008 by means of a VPA, tuned with standardised CPUE from commercial fleet and abundance indices from trawl surveys. A yield-per-recruit (Y/R) analysis (VIT program) was also applied.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for blue and red shrimp in the Mediterranean.

STOCK STATUS: The average SSB was 637 t in the period 2002-2008. SSB declined rapidly from 2002 to 2004, when it reached the lowest value (384 t) observed in the overall period, corresponding to 25% of that observed in 2002. Thereafter, SSB increased until 2008, coming back to the same level recorded at the beginning of the assessed time period. Recruits increased from 2003 to 2007, remaining at a high level in 2008. Mean fishing mortality varied without a clear trend between 0.8 and 1.3 from 2002 to 2008. The highest value was observed in the last year. Due to the lack of a management reference point SGMED-09-02 was unable to fully evaluate the state of the stock and its level of exploitation.

RECENT MANAGEMENT ADVICE: SGMED had no basis to provide specific management advice.

STECF COMMENTS: STECF highlighted the lack of target reference points which makes the provision of scientific advice difficult, and recommends that candidate reference points for SSB and F be evaluated during the SGMED 09-03 meeting. STECF recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009. STECF notes that no advice was provided by GFCM-SAC.

17.50. Red Shrimp (*Aristaeomorpha foliacea*) in Geographical Sub Area 11. Sardinian Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: *Aristaeomorpha foliacea* is one of the most important species in the Geographical Sub Area 11. The number of vessels has increased from 1994 to 2004 and old, low tonnage wooden boats have been replaced by larger steel boats. For the entire GSA an increase of 85% in number of boats >70 t has occurred.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. No formal assessment of this stock is available, however, information on stock status is available from national research programs (GRUND) and international trawl surveys (MEDITS), as well as Catch Assessment Surveys (CAMPBIOL)

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been proposed for this stock.

STOCK STATUS: The available information indicates an increasing trend in fishing mortality, however, it is not possible to evaluate if the fishery on the stock is sustainable.

RECENT MANAGEMENT ADVICE: GFCM-SCSA did not provide any advice for this stock.

STECF COMMENTS: STECF has no comments.

17.51. Deep water rose shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 6. Northern Spain

FISHERIES: The deep-water rose shrimp (*Parapenaeus longirostris*) is one of the most important crustacean species for the trawl fisheries in the GFCM GSA 6. A sharp increase in landings was observed from 1998 up to 2000, followed by a decreasing trend in 2001-2008. In 2008 the annual landings of this species amounted 33 t in the whole area, which is the lowest value observed. Fishing effort decreased from 50,000 days in 2000 to 13,000 in 2006, increasing up to around 18,000-19,000 in the last two years.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2008 advice is also provided by SGMED. The state of exploitation was assessed for the period 2002-2008 by means of a VPA tuned with standardised CPUE from commercial fleet and abundance indices from trawl surveys.

PRECAUTIONARY REFERENCE POINTS: SGMED recommended that $F \leq 0.2$ be established as a management target and a proxy for F_{msy} . The biomass reference points proposed for the stock are: $B_{lim} = 300$ t and $B_{pa} = 1,200$ t.

STOCK STATUS: Since 2002 SSB declined rapidly and continuously to the lowest value observed in 2008 (111 t), which represents only 8% of that observed in 2002. The MEDITS survey abundance index showed a very high peak in 1999-2001. Prior to 1999, abundance levels were comparable to those recorded in 2002-2008. SGMED noted that the level of 111 t is much lower than the proposed biomass reference values. Recruits (age 0 individuals) were estimated to have declined from 2002 to 2005 in the same pattern as SSB, remaining very low in 2006-2007. However, in 2008 recruitment returned to the 2003 level. Fishing mortality over ages 2-5 showed a high variation with an average value of $F=0.5$. SGMED 09-02 considered the stock being subject to overfishing.

RECENT MANAGEMENT ADVICE: SGMED recommended that the fishing effort be reduced until fishing mortality is below or at the proposed F_{MSY} proxy level ($F=0.2$). This should be achieved by means of a multi-annual management plan taking into account mixed-fisheries effects. Short- and medium-term predictions of catch and stock biomass consistent with a range of effort changes should be provided.

STECF COMMENTS: STECF notes the poor status of the deep water rose shrimp in GSA 06 and endorse SGMED and agrees with GFCM-SAC recommendations. STECF recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009.

17.52. Deep water rose shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 9. Ligurian and northern Tyrrhenian

FISHERIES: The deep water rose shrimp is one of the most important target species of bottom trawl fishery in GSA 9. The fishing grounds are located on muddy bottoms from 150 to 500 m depth. Annual trawl landings increased from 160 t in 2002 up to 450 t in 2006, decreasing to 220 and 254 t in 2007 and 2008 respectively. Discard of *P. longirostris* is scarce, ranging from 0.3 to 1.2% of the total catch of the species, and occurs mainly on the fishing grounds located at depth less than 200 m, where juveniles are more abundant.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. From 2008 advice is also provided by SGMED. The state of exploitation was assessed for the period 1994-2008 by means of SURBA and VIT analysis.

PRECAUTIONARY REFERENCE POINTS: SGMED proposed $F \leq 0.7$ as management reference point (basis $F_{0.1}(0-3)$).

STOCK STATUS: SGMED was unable to estimate the absolute stock size. Since 1998, SSB has been showing great fluctuations without a clear trend. Recent recruitment (2004-2006) is above the average for the time series of recruitment index (1994-2006) in the years 2004-2006. F_{1-3} was 0.5-0.6 in the period 2006-2008.

RECENT MANAGEMENT ADVICE: Basing on F estimates, SGMED considers the stock being harvested in a sustainable manner. However, SGMED recommends not to increase the fishing effort and highlights that any management measure should consider the mixed nature of the fisheries exploiting the pink shrimp stock.

STECF COMMENTS: STECF endorses the advice from SGMED 08-04. STECF recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009. STECF notes that there was no advice provided by GFCM-SAC.

17.53. Deep water rose shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 15-16. Strait of Sicily

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The deep-water rose shrimp is the main target species of the Sicilian trawlers and is caught both on shelf and upper slope throughout the year, peaking from March to July. The Sicilian trawlers between 12 and 24 LOA operate mainly on a short distance with trips from 1 to 2 days at sea, fishing on outer shelf and upper slope. The distant trawlers of Mazara del Vallo represent the main commercial trawling fleet of the area and one of the most important of the Mediterranean.

SOURCE OF MANAGEMENT ADVICE: The current fishing mortality was assessed with Length cohort analysis (LCA) on pseudocohort (2006-2007) and by Beverton & Holt Z estimator on trawl surveys data of MEDITS (2005-2005 and 2007) and GRUND (2005-2006) length frequency distributions. Yield and Biomass per Recruit and BRP (F_{max} , $F_{0.1}$ and $F_{SPR0.3}$) were assessed with Y & B per R approaches.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points were proposed by GFCM-SAC for this stock.

Based on its evaluation of the STECF-SGMED, STECF proposes the following biological reference points for this stock.

$F_{0.1}$ (1-3)= 0.83	Females;(TRP)
F_{max} (1-3)= 1.27	Females; (LRP)
F_{msy} (age range)= not available	
F_{pa} (F_{lim}) (age range)= not available	
B_{msy} (spawning stock)= not available	

STOCK STATUS: Overexploited. The fishery is being exploited at above a level which is believed to be sustainable in the long term, with no potential room for further expansion and a high risk of stock depletion/collapse.

Fishing mortality is estimated to be lower than F_{max} but above $F_{0.1}$. $F = 0.87$ is proposed as target reference point for this stock. Adopting $F=1.27$ as current F and $F=0.87$ as TRP, a decrease of 30% of the current fishing mortality is recommended.

RECENT MANAGEMENT ADVICE: SAC-GFCM Sub-Committee on Stock Assessment (SCSA) recommended to reduce the fishing mortality by 30% to the proposed target F of 0.87 by: a) decreasing of fishing capacity and activity; and b) improving the exploitation pattern (adoption of the new 40 mm square mesh opening and protect nurseries). SCSA also suggested to complete and improve the vessel monitoring system (VMS) to have data on spatial distribution of fishing effort.

In order to achieve the required reductions of fishing mortality, SGMED recommends reduction of fishing effort of the relevant fleet considering the mixed nature of the fisheries.

STECF COMMENTS: STECF endorses the advice of the SGMED 08-04 and agrees with the advice provided by GFCM-SAC.

17.54. Deep water rose Shrimp (*Parapenaeus longirostris*) in Geographical Sub Area 18. Southern Adriatic Sea

In the absence of any updates assessments, the summary and advice given below is reproduced from the STECF Review of advice for stocks of Community interest for 2009 (STECF, 2009, EUR 23630 EN).

FISHERIES: The deep water rose shrimp is one of the most important species in the Geographical Sub Area 18 representing more than 7-8% of landings from trawlers. Trawling represents the most important fishery activity in the southern Adriatic Sea with a yearly catch of around 30,000 t.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. No formal assessment of this stock is available, however, information on stock status is available from national research programs (GRUND) and international trawl surveys (MEDITS), as well as Catch Assessment Surveys (CAMPBIOL)

PRECAUTIONARY REFERENCE POINTS: Precautionary reference points have not been proposed for this stock.

STOCK STATUS: Trend of abundance indices highlighted a sharp increase since 2000 in the basin and expansion of the range of its geographical occurrence in GSA 18, as indicated also by the GIS representations.

RECENT MANAGEMENT ADVICE: No recent management advice is available.

STECF COMMENTS: STECF notes that in the absence of reference points the exploitation status of the stock cannot be fully evaluated and no advice can be provided.

17.55. Giant red shrimp (*Aristaeomorpha foliacea*) in Geographical Sub Areas 15 and 16 – Strait of Sicily

FISHERIES: The giant red shrimps is a relevant target species of the Sicilian and Maltese trawlers. It is mainly caught on the slope ground in the central–eastern side of the Strait of Sicily all year round, but landing peaks occur in summer. In 2006-2008 the yield of the Italian trawlers ranged from 1,260 to 1540 t, with the lowset value in 2008. In the same period the catches of the Maltese trawlers were between 26 t in 2006 and 34 t in 2007. Females represented more than 60% of the landings in weight. Due to catch reduction, since 2004 some Sicilian trawlers have moved to the eastern Mediterranean (Aegean and Levant Seas) to fish red shrimps.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. Since 2009 advice is also provided by SGMED. The state of exploitation was assessed by means of a VPA tuned with abundance indices from trawl surveys (2002-2008) and standardised CPUEs from the Sicilian commercial fleet (2006-2008). The SURBA software was also used to analyse the MEDITS time series.

PRECAUTIONARY REFERENCE POINTS: The management reference points proposed for the stock are: $F_{0.1} (1-3) = 0.35$ and $F_{max} (1-3) = 0.50$

STOCK STATUS: The stock abundance estimated on the length structure of the Sicilian trawlers for the years 2006-2008 ranged between 1,721 t (2008) and 1,883 t (2006), the SSB representing about 75% of the total stock biomass. Data from trawl surveys combining the two GSAs indicated the stock to vary without any evident trend over the period 2002-2008, with the highest SSB value in 2008. Due to the lack of precautionary management references SGMED was unable to fully evaluate the state of SSB.

The recruitment (18-22 mm CL) estimated with VIT ranged between 63 (2008) and 95 (2007) millions of recruits. A low variability in recruitment indices derived from SURBA was observed when combining the data of the two GSAs from 2002 to 2007, with the exception of a sudden fall in recruit density observed in 2006 in both GSAs 15 and 16.

As recent F ($F_{2008} = 0.77$) was estimated to be significantly higher than both $F_{0.1}$ and F_{max} , SGMED concluded that the stock of giant red shrimp in the GSAs 15 and 16 is overexploited.

RECENT MANAGEMENT ADVICE: SGMED recommends the fishing effort to be reduced until fishing mortality is below or at the proposed $F_{0.1}$ level. This should be achieved by means of a multi-annual management plan.

STECF COMMENTS: STECF endorses the advice from SGMED 09-02. and recommends that candidate SSB reference points are evaluated during the SGMED-09-03. STECF recommends that short and medium term projections be undertaken during the next SGMED meeting (SGMED 09-03) scheduled for December 2009. STECF notes that there was no advice provided by GFCM-SAC.

18. Elasmobranch Resources in the Mediterranean Sea

A long list of elasmobranch species has been reported to occur in the Mediterranean with 71 different species reported to be taken by Mediterranean fisheries. According to the official statistics provided by FAO-GFCM capture fisheries production dataset (Fishstat, 1970-2007), the nominal landings of elasmobranchs from the Mediterranean and Black Sea reached the highest values in the 1980s and 1990s, mainly reported in the Ionian Sea, with peaks of >23,000 tonnes in 1984, 1985, and 1994. From 1994, landings gradually declined, reaching a minimum of 8,732 tonnes in 2004. In the following years reported landings slightly increased. In 2007 the total nominal landing in the Mediterranean was 11,500 t.

According to IUCN (based on assessments conducted in 2003), forty-two percent (30 species) of Mediterranean chondrichthyan fishes are considered threatened (Critically Endangered, Endangered or Vulnerable) within the region. Of these, 18% (13 species) are Critically Endangered, 11% (8 species) are Endangered and 13% (9 species) are Vulnerable. A further 18% (13 species) of Mediterranean chondrichthyans are assessed as Near Threatened and 14% (10 species) are assessed as Least Concern. Little information is known about 26% (18 species), which have therefore been assessed as Data Deficient. A higher percentage of elasmobranchs are clearly more seriously threatened inside the Mediterranean than they are globally.

A feature of concern is the large number of gaps in the time series for elasmobranch species for the Mediterranean and poor identification of species in the landings. For example, the collective groups “Shark, rays, skates etc” and “Rays, stingrays, mantas” accounted for 59% of the total landings in 2007. In the Mediterranean, the collection of stock related variables is requested by DCR only for *Raja clavata* and *Raja miraletus*, but even for these two species member states may not collect any data if their landings for species are less than 200 tonnes on average during the three previous years or represent less than 10% of total Community landings (Commission Decision, 2008/949/EC, adopting a multi annual Community programme pursuant to Council Regulation (EC) No 199/2008 establishing a Community framework for the collection, management and use of data in the fisheries sector and support for scientific advice regarding the Common Fisheries Policy). Consequently it is quite difficult to define and assess the most important stocks. The following list of species has been defined as a starting point for a better future definition, also taking into account the issues raised by the ICCAT, GFCM and the STECF-SGRST. The text reported below provides a summary of the stock and fishery related information available to STECF from FAO-GFCM and ICCAT as well as from MEDITS and GRUND programs at the time of preparing the report. Only two assessments on two stocks (*Raja clavata* and *Raja asterias*) in one GSA (9) were recently presented at the GFCM Subcommittee on Stock Assessment in 2008.

STECF notes that several updates, mainly regarding the landings and the stock status, have been added to the present report for most of the species listed below. However, more detailed data both on landings and on stocks are needed in the future for providing management advice for these stocks. Stock related variables are not collected in the framework of the DCR for most of elasmobranchs, which makes stock assessment difficult for most species.

18.1. Basking shark (*Cetorhinus maximus*)

FISHERIES: The Basking shark is a by-catch in several fisheries with a very low market interest. Basking shark was mostly taken as a by-catch by driftnets used for swordfish fishery (driftnets have been banned since January 1, 2002 for the EU fleets, and since 2004 in all the Mediterranean according to ICCAT and GFCM Recommendations). It is also caught by several other fishing gears in the Mediterranean, mostly by gill and trammel nets or occasionally in pelagic trawls. This species is not considered as a commercial species in several areas.

On the basis of the most recent data reported by the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2007), landings for this species are only reported by Spain. The yearly landings ranged from 2 to 6 tonnes in the period 1996-2007, with a peak of 10 t in 2004, and represented from 0.1% to 0.7% of the total catch of elasmobranchs in the western Mediterranean.

Documented fisheries in several regions have usually been characterized by rapidly declining local populations as a result of short-term fisheries exploitation, followed by very slow or no recorded population recovery. There is likely potential for similar population declines to occur in the future from directed and by-catch fisheries, driven at least in part by the demand for fins in international trade. This species is considered extremely vulnerable to overfishing, perhaps more than most sharks, ascribed to its slow growth rate, lengthy maturation time, long gestation period, probably low fecundity and probable small size of existing population.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: no data available.

RECENT MANAGEMENT ADVICE: The Mediterranean is considered as a separate management unit. The Basking shark is a protected species in the Mediterranean, according to the Barcelona Convention (Appendix 2), the Bonn Convention (Appendix 1) and the Bern Convention (Appendix 2), and is also listed in Appendix II of

CITES. This species is listed as Vulnerable both in the Mediterranean (VU A2bd; assessed in 2003) and globally (VU A1ad+2d; assessed in 2000) in the IUCN Red List.

STECF COMMENTS: STECF recommends a better reporting of the Basking shark catches from all the fisheries involved, with the purpose to assess the possible impacts.

18.2. Thresher shark (*Alopias vulpinus*)

FISHERIES: This pelagic species is sometimes caught by several fishing gears, always as by-catch, but it is often retained on board and sold on the market for its good price. In the Northern Adriatic Sea, gillnets (often set for demersal species) also have a by-catch of pelagic species, with *Alopias vulpinus* taken during the summer. A number of specimens of this species may be also taken in large driftnet fisheries; even though this fishery has been prohibited in the Mediterranean for several years. Surface long-line fisheries, that target tuna and swordfish, also catch *A. vulpinus*.

Data on catches are extremely poor and sometimes include another species (*Alopias superciliosus*), much more rare in the Mediterranean. On the basis of the most recent data reported by FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2007), landings for this species in the Mediterranean are reported by Spain (1997-2007), Portugal (2001-2007), and France (1999-2007). The catches ranged from 3 to 21 tonnes in the period 1996-2006, representing from 0.1% to 1% of the annual total catch of elasmobranchs reported for the western Mediterranean. The annual mean catch was around 15 t between 1999 and 2006 but declined to 8 t in 2007.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM, but this species is also under the ICCAT responsibility.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The Mediterranean is considered as a separate management unit for this species. In the IUCN Red List, the species is listed as Vulnerable in the Mediterranean (VU A2bd + 3bd; assessed in 2003). The global population is listed as Data Deficient (DD; assessed in 2002) due to a lack of catch data, incomplete knowledge of stock structure, and uncertainty over life history parameters which make it impossible to determine population size and fluctuations.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF recommends a better reporting of the Thresher shark catches from all the fisheries and Member States involved, with the purpose of better understanding the current state of the stock.

18.3. Tope shark (*Galeorhinus galeus*)

FISHERIES: This pelagic species is caught by a variety of fishing gears, always as by-catch, but it is often retained on board and sold on the market. A target fishery used to be practiced two decades ago in the central Aegean Sea, with steel-wired longlines. Specimens may be caught in large pelagic long-line fisheries and set nets fisheries. Data on catches are extremely scarce, often mixed with other species. On the basis of the most recent data reported in the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2007), landings for this species are only reported by Spain (2004-2007), ranging between 15 and 36 t, representing about 1% of the total catch of elasmobranchs in the western Mediterranean.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: The Mediterranean is considered as a separate management unit for this species. Although there are no target fisheries for *G. galeus* in the Mediterranean, declines are suspected to have occurred, and by-catches are rare. Overfishing, together with habitat degradation caused by intensive bottom trawling, are considered some of the main factors that have produced the suspected decline of the Mediterranean stock. In the IUCN Red List, it is listed as Vulnerable both in the Mediterranean (VU A2bd; assessed in 2003) and globally (VU A2bd + 3d + 4bd; assessed in 2006).

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF recommends the collection of basic information on the tope shark catches to better understand the current situation of the stock.

18.4. Smooth hammerhead (*Sphyrna zygaena*)

FISHERIES: A relatively common and widespread shark, captured in a number of fisheries throughout its range, mostly by gillnet and long-line. There might be a significant mortality of this species in large-scale long-line and driftnet fisheries, even though this fishery is prohibited in the Mediterranean. However, the impact of these fisheries on populations is unknown at present. Data on catches are extremely scarce. On the basis of the most recent data reported in the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2007), landings for this species are only reported by Albania (2000-2006), ranging between 0 and 7 t, corresponding to around 0.3% of the total catch of elasmobranchs in the central Mediterranean. Zero catches were reported in 2007. These catches are clearly underestimated due to the non-reporting by many Mediterranean States.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM, but this species is also under the ICCAT responsibility.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: In the IUCN Red List, it is listed as Vulnerable in the Mediterranean (VU A4bd; assessed in 2003) and LR/nt (Lower Risk, near threatened; assessed in 2000) globally.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF recommends the collection of basic information on the smooth hammerhead catches by the EU Member States to better understand the current situation of the stock.

18.5. *Carcharhinus* spp.

FISHERIES: In the Mediterranean waters the genus *Carcharhinus* is represented by 8 taxa (*C. altimus*, *C. brachyurus*, *C. brevipinna*, *C. falciformis*, *C. limbatus*, *C. obscurus*, *C. plumbeus*, and *Carcharhinus* spp.), many of which occur primarily in the western parts, close to the Gibraltar Strait (FAO statistical sub-area 1.1) and North African coasts. These species are often caught as by-catch in surface long-line fisheries targeting tuna and swordfish. A number of specimens may also be caught by large driftnet fisheries, even though this fishery is prohibited in the Mediterranean. In Libya they can sometimes be considered as target species. Management units are suggested for all species known to occur in the Mediterranean.

The landings of most of these species are usually included by FAO (Fishstat, 1979-2007) in the large group of sharks, rays, skates, etc., and they are not included in the ICCAT SCRS report.

SOURCE OF MANAGEMENT ADVICE: The advisory body for these species are SAC-GFCM and ICCAT.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: Sandbar shark (*C. plumbeus*) is one of the most widely distributed members of this genus in the Mediterranean, and it has important nursery grounds in certain areas (e.g. in FAO sub-area 3.1). As a preliminary measure, three separate management units are proposed (FAO statistical areas 1, 2 and 3). In the IUCN Red List, it is listed as Endangered in the Mediterranean (EN A2bd + 4bd; assessed in 2003) and LR/nt (Lower Risk, near threatened; assessed in 2000) globally.

Spinner shark, *C. brevipinna*, and blacktip shark, *C. limbatus*, are both widely distributed throughout the Mediterranean, although they may be more common along the coasts of North Africa. The suggested management unit for these two species is the Mediterranean, where their status is Data Deficient (DD; assessed in 2003) according to the IUCN. Globally they are listed as LR/nt (Lower Risk, near threatened; assessed in 2000) in the IUCN Red List.

Bignose shark, *C. altimus*, copper shark, *C. brachyurus*, and dusky shark, *C. obscurus*, are all species occurring in the Northeast Atlantic and western Mediterranean, although occasional specimens are recorded from eastern Mediterranean basins. Each of these species should be managed for the Northeast Atlantic, including the Mediterranean. All three species are listed as Data Deficient (DD; assessed in 2003) in the Mediterranean according to IUCN. Globally, *C. brachyurus* and *C. obscurus* are listed as LR/nt (Lower Risk, near threatened; assessed in 2003 and 2000 respectively) in the IUCN Red List.

Silky shark *C. falciformis* is an oceanic species that is occasionally reported from the Mediterranean and off Spain. This species should be managed as a North Atlantic population, which includes the Mediterranean.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF recommends the collection of basic information on the catches of the different *Carcharhinus* species occurring in the Mediterranean with the aim of better understanding the current state of these species and assessing the possible impacts of the different fisheries.

18.6. Sixgill shark (*Hexanchus griseus*)

FISHERIES: This large demersal species is occasionally caught by several fishing gears, as by-catch, and sometimes retained on board and sold on the market. Target fisheries (long lines or bottom gillnets) exist in some parts of the Mediterranean (e.g., in the Greek seas). Data on catches are extremely scarce. Studies conducted during the MEDITS project (1994-1999) assessed the standing stock biomass in the Mediterranean at about 440 tonnes. Deep commercial trawl surveys (1998-99) in the western Italian basins showed yields of about 1.2 kg/hour in average, with a peak of 4.7 kg/h in the Tyrrhenian Sea. More recent catch data are not available.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Due to the little information available, the stock should be managed for the whole Mediterranean. It is listed as LR/nt (Lower Risk, near threatened) in the IUCN Red List both in the Mediterranean and globally (assessed in 2003 and 2000 respectively).

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF notes that no new catch data are available and recommends the collection of basic information on the sixgill shark catches, to better understand the current situation of this long-living species. The MEDITS time series (1994-2009) of catches is an important source of data and should be analyzed to find recent trends in the abundance and/or occurrence of the species.

18.7. Spurdog (*Squalus acanthias*)

FISHERIES: This demersal species is commonly caught by trawlers and often retained on board and sold on the market. Data on catches are good in some countries (e.g., Greece) and poor in others, according to the various statistical systems adopted. The species is easily confused with *Squalus blainvillei*, also present in the Mediterranean. On the basis of the most recent data reported in the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2007), landings of this species in the Mediterranean and Black Sea were reported by France, Malta, Slovenia, Spain, Bulgaria, Romania and Ukraine and ranged from 86 to 1789 tonnes in the period 1970-2007, representing from 0.6% to 7.8% of the total catches of elasmobranchs reported in the Mediterranean and Black Sea. The catches peaked in 1988 at 1789 t and then gradually declined to levels around 100 t (86 t in 2007). Most of the catches were reported from the Black Sea. The minimum value of catches was observed in 2007.

Studies conducted during the MEDITS project (1994-1999) assessed the standing stock biomass in the Mediterranean at about 6,682 tonnes. Deep commercial trawl surveys (1998-1999) in the western Italian basins showed yields of about 0.14 kg/h in average, with a peak of 0.64 kg/h in the Sardinian Sea.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Although naturally abundant, this is one of the more vulnerable species of shark to over-exploitation by fisheries because of its late maturity, low reproductive capacity, longevity, long generation time (25-40 years) and, hence, a very low intrinsic rate of population increase (2-7% per year). Population segregation and an aggregating habit make mature (usually pregnant) females highly vulnerable to fisheries even when stocks are seriously depleted. In the MEDITS 2007 report, *Squalus acanthias* population exhibited no trend in abundance in 3 GSAs where it was evaluated. Mediterranean and Black Sea stocks are unmanaged, with a >60% decline reported in a Black Sea stock assessment for 1981-1992. For these reasons this species was

listed as Endangered for the Mediterranean by the IUCN Red List (EN A2bd+4bd; assessed in 2003), while globally the species is listed as Vulnerable (A2bd + 3bd + 4bd; assessed in 2006).

RECENT MANAGEMENT ADVICE: The information available indicates that it may be appropriate to establish separate management areas for fisheries exploiting spurdog in the Mediterranean and Black Sea.

STECF COMMENTS: STECF recommends the collection of data on catches and fisheries separately by management area. The MEDITS time series (1994-2009) of catches is an important source of data and should be analyzed to find recent trends in the abundance and/or occurrence of the species.

18.8. Small-spotted catshark (*Scyliorhinus canicula*)

FISHERIES: The presence of *S. canicula* in the Mediterranean Sea is mainly linked to the continental shelf with the highest densities between 50 and 200 m. The main concentration areas of the juveniles (total length <28 cm, weight <68 g) are located at greater depths, essentially between 200 and 500 m (Corsica and Sardinia), with the exception of the western Morocco (100-200 m depth). The small-spotted catshark *Scyliorhinus canicula* is common over all the shelf of the northern Mediterranean Sea excluding the southern portion of Italy where it is less abundant. Trawlers and set gillnets very commonly catch this demersal species which is often retained on board and sold on the market. Data on catches are good in some countries (i.e.: Greece) and poor in others, according to the various statistical systems adopted. Although it is widespread over the Mediterranean, landings for this species are reported only by France (Fishstat, 1970-2007) and they amounted to around 30 tonnes/year in the period 2000-2007 (29 t in 2007), representing from 1.2% to 2.3% of the total catches of elasmobranchs reported in the western Mediterranean basin.

Studies conducted during the MEDITS project (1994-1999) showed a high frequency of occurrence (>5% of the hauls) and abundance (>10 kg/km² or >10% of relative biomass) for this species. MEDITS project assessed the standing stock biomass in the Mediterranean at about 8,396 tonnes, the highest value among all the elasmobranch species. The highest densities (>100 kg/km²) were located around Corsica and Sardinia Islands, but significant densities (30-50 kg/km²) were also found in the Gulf of Lion, Catalan and Aegean Seas. The most representative biomass of small-spotted catshark in the Mediterranean (about 2,900 tons) was located on the Greek shelf in the Aegean Sea, likely due both to the large extension of the continental shelf and to under-exploitation. In the western part of the Mediterranean, from France to Morocco, *S. canicula* showed a latitudinal distribution pattern, with both density and biomass dominating in the Catalan Sea and decreasing towards lower latitudes (Morocco).

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: In the MEDITS 2007 report, *Scyliorhinus canicula* population showed no trend in abundance in 9 GSAs, increasing trend in 2 areas (Northern Alboran Sea, South Sicily and Malta), and decreasing trend in one GSA (Gulf of Lions). Indications at the present time are that the status of this species in the Mediterranean and globally is Least Concern (LC, proposed for the IUCN Red List).

RECENT MANAGEMENT ADVICE: The information available indicates that it may be appropriate to establish separate management areas for fisheries exploiting *S. canicula* in the Mediterranean and Black Sea.

STECF COMMENTS: STECF notes the lack of recent assessment for this species and recommends the collection of data on catches and basic biological data to better define the stock status and the local populations. The MEDITS time series (1994-2009) of catches is an important source of data and should be analyzed to find recent trends in the abundance and/or occurrence of the species.

18.9. Blackmouth catshark (*Galeus melastomus*)

FISHERIES: Common to abundant where it occurs, from upper continental slope between 200 and 1200 m of depth, mainly at 300 to 400 m in all the Mediterranean basin (excluding north Adriatic sea and the Black sea). Blackmouth catshark is often caught as by-catch by trawl nets and bottom long-lines and has not a good commercial value with most captured specimens discarded at sea, especially in the Italian seas.

On the basis of the most recent data reported in the FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2007), landings for this species are only reported by Spain. The yearly landings ranged from 49 to 90

tonnes in the period 2002-2007, with an average value at around 60 tonnes/year, and represented from 2% to 6% of the total catches of elasmobranchs in the western Mediterranean.

The species showed a high occurrence and abundance (>5% of the hauls and >10 kg/km² or >10% of relative biomass) throughout the surveyed areas. Particularly high abundances were found in the Alboran Sea, central Tyrrhenian, south Adriatic Sea and the Sicilian Channel, with locally very high concentrations up to 480 kg/km². The standing stock biomass in the Mediterranean was assessed at about 6,891 tonnes, one of the highest values among all the elasmobranch species. Deep commercial trawl surveys (1998-99) in the western Italian basins showed yields around 1.3 kg/hour in average, with a peak of 2.7 kg/h in the central Tyrrhenian Sea. Along Morocco, Spain, France and around Crete Island the specimens larger than 30 cm of total length were dominating (78% of the total). The opposite happened around Corsica and Sicily islands, in the Ionian, and south Adriatic and Aegean Seas, where the specimens over 30 cm TL only represented the 23% of the total sampled population. An intermediate situation was observed in the Tyrrhenian Sea, where 44% of the sampled population was below 30 cm TL.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The time series (1994-2004) of the abundance indicator of blackmouth catshark had an increasing trend in 4 MEDITS GSAs (Northern Spain, Corsica, Ligurian and North Tyrrhenian Sea, South and Central Tyrrhenian) and was stable in 8 GSAs, while the average length was stationary in all areas. In the Mediterranean, this species is of Least Concern (LC, proposed for the IUCN Red List). No decline in abundance was observed in any MEDITS GSA during 1994-2004.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF notes the lack of recent assessment and recommends a better reporting of the blackmouth catshark catches from all the fisheries and Member States involved to better understanding the current state of the stock. The MEDITS time series (1994-2009) of catches is an important source of data and should be analyzed to find recent trends in the abundance and/or occurrence of the species.

18.10. Blue stingray (*Pteroplatytrygon violacea*)

FISHERIES: This species is very commonly caught by pelagic gears as by-catch and more rarely by trawlers; it is sometimes retained on board and sold in a few markets. Data on catches are usually extremely poor. This species represented 9.3% in weight of the total catches obtained by swordfish long-lines in 1991 in the Tyrrhenian Sea. A number of specimens may be taken also in large driftnet fisheries, although this fishery is prohibited since years in the Mediterranean. During twenty-two GRUND trawl surveys carried out from 1985 to 1998 in the Italian waters the percentage presence of *P. violacea* was low (6.20%).

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: There are no reliable quantitative estimates of stock status. In the Mediterranean, this species is listed as LR/nt (Lower Risk, near threatened; assessed in 2003) according to the IUCN Red List.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF notes the lack of recent data and recommends a better reporting of the Blue stingray catches from all the fisheries and Member States involved due to the high number of specimens reported in surface fisheries.

18.11. Skates (*Rayformes*)

FISHERIES: Fifteen species of skate occur in the Mediterranean Sea (*Dipturus batis*, *D. oxyrhynchus*, *Leucoraja circularis*, *L. fullonica*, *L. melitensis*, *L. naevus*, *Raja asterias*, *R. brachyura*, *R. clavata*, *R. miraletus*, *R. montagui*, *R. polystigma*, *R. radula*, *R. undulata* and *Rostroraja alba*), including several species of Atlantic skate that are distributed in the western Mediterranean only, with fewer species occurring in the eastern Mediterranean. As in Atlantic regions, the genus *Raja* dominates in coastal waters, with *Leucoraja* spp. and *Dipturus* spp. abundant further offshore. For example, Italian fisheries operating in deep-waters (350-800 m)

take *D. batis*, *D. oxyrinchus*, and *L. circularis*. There are two endemic skates present: the Maltese ray (*Leucoraja melitensis*) and speckled ray (*Raja polystigma*). All the species are very commonly taken by trawlers and by artisanal coastal fisheries; some of them are retained on board and sold on the market. Data on catches are usually extremely poor and mixed. In FAO statistics all rays, stingrays and mantas are grouped in one category. Total landings for this category in the Mediterranean ranged from 3,160 to 9,418 tonnes during the period 1970-2007. Good catch rates of *R. clavata* are found in the Gulf of Lions, Corsica, Sardinia and Greece waters. It is worth noting that up to 64% of the total Mediterranean chondrichthyans biomass is located in the Aegean Sea, where trawling deeper than 400 m is practically inexistent. Considering the mean size at first maturity of this species calculated for all the Mediterranean area, the Ionian Sea is the most important area where the juvenile specimens are concentrated.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Studies conducted during the MEDITS project (1994-1999) based on trawl surveys assess the mean standing stock biomass in the Mediterranean of all these species at 16,744 tonnes in total. The most common species is *Raja clavata*, having a standing stock biomass of 8,151 tonnes. In the MEDITS 2007 report which covers the period 1994-2004, *Raja asterias* population exhibited no trend in abundance in 4 subareas, increasing trend in 1 subarea (Corsica) and decreasing trend in 1 subarea (Aegean Sea). *R. clavata* population exhibited no trend in abundance in 6 subareas, increasing trend in 1 subarea (South of Sicily and Malta) and decreasing trend in 1 subarea (Corsica). These species were separately assessed in GSA 9.

The common skate, *Dipturus batis*, formerly occupied the shelf and slope areas of the Mediterranean excluding North Africa, west of Morocco, but now appears to be virtually absent from much of this range. It is reported as locally extinct in the Adriatic Sea. It is also presumed absent from Tunisian waters where it has not been recorded since 1971. *Dipturus batis* is listed as Critically Endangered (CR A2bcd + 4bcd) both in the Mediterranean and globally (assessed in 2003 and 2006 respectively).

The Maltese skate *Leucoraja melitensis* is a Mediterranean endemic that is under imminent threat of extinction. It was previously found over a relatively restricted area (about ¼ of the total area of the Mediterranean Sea) in the depth range where trawl fisheries routinely operate. This species is now extremely rare and its main range now appears to be restricted to the Strait of Sicily. It is also rare off Malta and rare or absent off Tunisia, where it was previously considered moderately common. Although population data are lacking, given the small range of the remaining population, the potential detrimental impact of trawl fisheries is likely to be significant. The Maltese skate, *Leucoraja melitensis*, is assessed as Critically Endangered (CR A2bcd + 3bcd + 4bcd; assessed in 2006) on the basis of very rapid population decline, which is estimated to exceed 80% in three generations.

In the Mediterranean, the majority of the population of *Raja montagui* appears to exist between 100–500m, although it occurs from the shallows to 600m. Populations of *R. montagui* appear to be stable in most parts of the Mediterranean. *Raja montagui* has been assessed by IUCN as Least Concern in the Mediterranean (assessed in 2007), although population trends and by-catch levels should be monitored to ensure a stable population is maintained.

The white skate, *Rostroraja alba*, was formerly captured frequently in the NW Mediterranean during the 1960s and off Tunisian and Morocco in the early to mid 1970s. It is now considered rare and is believed to have undergone a significant but currently unquantifiable decline in abundance and extent. The MEDITS survey suggests a substantial reduction in geographic range and the current distribution of occurrence of this species represents a small fraction of its former range. *Rostroraja alba* is listed as Critically Endangered (CR A2cd + 4cd; assessed in 2003) in the Mediterranean and Endangered (EN A2cd + 4cd; assessed in 2006) globally.

The sandy skate, *Leucoraja circularis*, is listed as Endangered (EN A2bcd + 3bcd + 4bcd; assessed in 2003) in the Mediterranean. The speckled skate, *Raja polystigma*, is considered endemic in the Mediterranean Sea. In the Mediterranean, this species is listed as LR/nt (Lower Risk, near threatened; assessed in 2003) according to the IUCN Red List. The sharpnose skate, *Dipturus oxyrinchus* and the cuckoo skate *Leucoraja naevus*, are considered as LR/nt (Lower Risk, near threatened; assessed in 2003) according to the IUCN Red List. The twineye skate, *Raja miraletus*, is currently assessed as Least Concerned (LC; assessed in 2003) in the Mediterranean, while the shagreen skate, *Leucoraja fullonica*, the blonde skate, *Raja brachyura*, the rough skate, *Raja radula* and the undulate skate, *Raja undulata*, are all Data Deficient (DD; assessed in 2003) species in the Mediterranean.

RECENT MANAGEMENT ADVICE: None

STECF COMMENTS: STECF recommends the collection and reporting of basic data on species-specific catches. Research efforts focusing on species for which there is currently little knowledge (DD species) is highly desirable. Reporting in National and FAO statistics should be species specific. Protection measures of coastal and offshore nurseries areas of these species should be enforced. The MEDITS time series (1994-2009) of catches is an important source of data and should be analyzed to find recent trends in the abundance and/or occurrence of skates in the Mediterranean.

18.12. Thornback skate (*Raja clavata*) in Geographic Sub Area 9. Ligurian and Northern Tyrrhenian

FISHERIES: The assessment was based on the fishery activity in Viareggio (Northern Tyrrhenian Sea), where a fleet of 80 vessels of different sizes and tonnage is based. Most of them target demersal resources and in general utilize bottom trawl nets locally called “volantina”. A reduced number of vessels utilizing the *rapido* (a variant of the beam trawl) and part of the small-scale fleet also targets demersal species, but landings of these fractions of the fleet are of modest entity. Although commercial valued resources are distributed over all the wide continental shelf and slope, considering the characteristics of the fishing vessels and traditions, the Viareggio fleet mainly exploit the coastal resources. The thornback skate is among the abundant species in catches.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. A Y/R analysis, based on bottom trawl data obtained from a sampled fleet in the harbour of Viareggio in the years 1990-2004, was undertaken in 2008.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The preliminary Y/R assessment provided the following results:

$F = 0.25$

Current Y/R: 0.257 kg per recruit

Maximum Y/R: 0.39 kg per recruit

Y/R 0.1: 0.38 kg per recruit

$F_{max} = 0.092$

$F_{0.1} = 0.064$

Maximum B/R: 13.68 kg per recruit

B/R: 1.03 kg per recruit

This population was defined as overexploited; however it is likely that the biological characteristics of the species made it more resilient to high levels of fishing activity. Research survey data do not show a decline in the abundance of *R. clavata* that can be interpreted as an index of recruitment overfishing. In fact, an increase in catch rates for this species is observed. These findings do not seem to be in agreement with those derived from commercial data, which suggest a negative trend for the species. The thornback skate, *Raja clavata*, in the Mediterranean and globally, is listed as LR/nt (Lower Risk, near threatened) according to the IUCN Red List.

RECENT MANAGEMENT ADVICE: The assessment is considered preliminary and no specific management advice has been recommended by the GFCM-SCSA.

STECF COMMENTS: STECF notes that the assessment has been performed on data collected by vessels from only one port of the GSA 9, and these results may not be representative of the overall state of the stock in GSA 9. A more extended database is necessary to provide the assessment for the entire GSA.

18.13. Starry skate (*Raja asterias*) in Geographic Sub Area 9. Ligurian and Northern Tyrrhenian

FISHERIES: The assessment was based on the fishery activity in Viareggio (Northern Tyrrhenian Sea), where a fleet of 80 vessels of different sizes and tonnage is based. Most of them target demersal resources and in general utilize bottom trawl nets locally called “volantina”. A reduced number of vessels utilizing the *rapido* (a variant of the beam trawl) and part of the small-scale fleet also targets demersal species, but landings of these fractions of the fleet are of modest entity. Although commercial valued resources are distributed over all the wide continental shelf and slope, considering the characteristics of the fishing vessels and traditions, the Viareggio fleet mainly exploit the coastal resources. The thornback skate is among the abundant species in catches. For *Raja asterias*, a nursery ground in the Tyrrhenian Sea was reported.

SOURCE OF MANAGEMENT ADVICE: The management advisory body is SAC-GFCM. A Y/R analysis based on bottom trawl data obtained from a sampled fleet in the harbour of Viareggio in the years 1990-2004 was undertaken in 2008.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The preliminary assessment provided the following results:

$F = 0.15$

Current Y/R: 0.079 kg per recruit

Maximum Y/R: 0.097 kg per recruit

Y/R 0.1: 0.93 kg per recruit

$F_{max} = 0.33$

$F_{0.1} = 0.23$

Maximum B/R: 1.145 kg per recruit

B/R 0.1: 0.44 kg per recruit

The stock was preliminary assessed as moderately exploited, with a low level of fishing effort. The time series of LPUE shows no trend. Following the general criteria based on life history aspects to define extinction risk in marine fishes, *R. asterias* should be included within the “medium productivity category”. This species is currently assessed as Least Concerned (LC) by the IUCN Red List, but further information on its status in the southern Mediterranean is needed.

RECENT MANAGEMENT ADVICE: The assessment is considered preliminary and no specific management advice has been recommended by the GFCM-SCSA.

STECF COMMENTS: STECF notes that the assessment has been performed on data collected by vessels from only one port of the GSA 9, and these results may not be representative of the overall state of the stock in GSA 9. A more extended database is necessary to provide the assessment for the entire GSA.

19. Resources in the Black Sea

19.1. Turbot (*Psetta maximus*) in Black Sea

FISHERIES: Turbot in the Black Sea is exploited by all riparian countries. In the last 5 years according to the official statistics the annual catch was between 400 and 1000t, 70% of which was caught by Turkish vessels. In EU waters (Bulgaria and Romania) the annual catch in 2007 and 2008 is about 100t corresponding to the agreed quota. The extent of illegal and unreported fishing in different countries is unknown, but is thought to be important because of the high market value of turbot. Turbot fishing in Turkish waters of the Black Sea is carried out by bottom gill nets (70%), bottom trawls (28%) and by-catch from trawls and purse seines (2%). Turbot fishing in the other countries (including EU waters) is carried out by bottom gill nets because of a moratorium on bottom trawling.

Catches in the last years are in the order of 7% to 15% (depending on the countries) of the catches reported in the 1970s and 1980s.

SOURCE OF MANAGEMENT ADVICE: The management advice is provided by STECF based on assessments performed by the Black Sea Sub Group (STECF SG Black Sea-09-02). SG Black Sea has applied XSA to assess the stock of turbot, but because of uncertainties about actual catch the assessment is interpreted only in relative terms – i.e. it is considered indicative of trends only.

MANAGEMENT AGREEMENT: The TACs for turbot catches in 2007 and 2008 and quotas allocation was introduced regarding to Council Regulations (EC) No 1579/2007 and No 1139/2008. Both for Bulgaria and Romania quotas of 50 t for each country were permitted. The size of TAC is not based on an analytical procedure but on historical catches and is a matter of negotiations between Bulgaria, Romania and the EC. No management agreement exists with other Black Sea countries. Also mesh size of gillnets is regulated.

PRECAUTIONARY REFERENCE POINTS: Currently precautionary reference points are not applied.

STOCK STATUS: SG Black Sea has applied XSA to assess the stock of turbot, but because of uncertainties about actual catch the assessment is interpreted only in relative terms – i.e. it is considered indicative of trends only. Current biomass of turbot is much lower compared to historical levels.. The drop in abundance is consistent with the decreases in CPUE and landings. Recruitment has increased since 2002 and positively influenced the SSB, but given that many small and immature turbot are caught by the fisheries such a positive influence may not propagate in the next years. Fishing mortality of turbot is high.

MANAGEMENT OBJECTIVES: No formal management objectives have been adopted either by the EU or other countries that exploit turbot in the Black Sea.

RECENT MANAGEMENT ADVICE: STECF consider that the results of the most recent assessment conducted during the STECF-SGRST Working Group in Brest in July 2009 are not sufficiently reliable to use as the basis for quantitative management advice on fishing opportunities for 2010. Therefore, in line with the advice given in STECF plenary report of April 2009, STECF advises that the exploitation of turbot in the Black Sea should be kept at the lowest possible level in order to allow the stock to recover.

STECF COMMENTS: The most recent assessment was rejected by STECF as a basis for advice on fishing opportunities for 2010 because of unreliable catch data and poor model fit.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that this stock can be classified under Category 10. Accordingly STECF notes that the rules for the above category imply the following options for TACs in 2010.

Category 10 STECF advises a reduction to the lowest possible level or similar advice.

	2010 TAC *	Basis
Category 10	75t	The TAC should be reduced by at least 25%. Recovery measures should be implemented including effort reductions and introduction of more selective fishing gear

* relates to a unilateral EU TAC

19.2. Sprat (*Sprattus sprattus*) in Black Sea

FISHERIES: The fishing grounds of Black Sea sprat are in the shelf area (up to 100-120m in depth). Sprat fishing with mid-water trawls in EU waters and pair-trawls in Ukraine and in Turkey is undertaken with large fishing vessels (>12m) at mainly at depths between 30 and 60 m. During summer months (July-August) sprat inhabits deeper water below the thermocline (usually under 10.5 C at 20 m depth),. There is substantial warming up of waters during summer and above the thermocline water temperatures reach 25-27 C°. The sprat fishery is carried out year round, with the highest yields in May-October. In Turkey, the main fishing season is spring (April) and late autumn (November).

SOURCE OF MANAGEMENT ADVICE: The management advice is provided by STECF based on assessments performed by the Black Sea Sub Group (STECF SG Black Sea-09-02). Ukraine and Russian Federation also apply TAC in their national waters.

MANAGEMENT AGREEMENT: A quota is allocated in EU waters of the Black Sea (Bulgaria and Romania). No fishery management agreement exists between other Black Sea countries. In the EU Black Sea waters a TAC 12 750 t was set for 2009. This figure is a result of a reduction of the 2008 TAC of 15 000 t based on the precautionary principle.

PRECAUTIONARY REFERENCE POINTS: F_{MAX} could not be estimated. The YpR curve has a maximum well outside any reasonable range. The skewed shape of the YpR curve results from the high natural mortality and the short life span of sprat in the Black Sea. Due to such effects, STECF rejected the proposed $F_{0.1}=1.71$ as an appropriate management reference point.

The results of an age structured production model indicate that MSY is estimated to be in the range of 44,442 t. F_{msy} (ages 1-3) is estimated to be 0.53. B_{msy} appears to be in the range of 128,000 t.

STOCK STATUS: The analyse of the main population parameters reveals that the sprat stock has recovered from the depression in the 1990s due to good recruitment in 1999-2001 and the biomass and catches have gradually increased over the 1990s and early 2000s. The stock estimates, however, confirm the cyclic nature the sprat population dynamics. The years with relatively strong recruitment were followed by years of low to medium recruitment, which leads to a relative decrease of the Spawning Stock Biomass (SSB). High fishing mortalities (F_{1-3}) were observed in 1990-1994, 1998, and 2003. In recent years SSB has decreased due to lower recruitment and high fishing mortality. Landings have initially (in 2001-2005) reached levels comparable to the 1980s but then dropped in 2006-2007. In 2008 landings and fishing mortality increased again coincident with an expansion in the Turkish fishery. SSB and recruitment were at a medium level in 2008 similar to 2007. Short-term projectons with status quo fishing of around 50,000t annual catch predict that in 2008-2011 SSB will decrease from 173,000 to 144,000 t (17%). Current fishing mortality $F_{1-3} = 0.52$ is close to the estimated $F_{msy}=0.53$.

MANAGEMENT OBJECTIVES: No formal management objectives have been adopted either by the EU or other countries that exploit sprat in the Black Sea.

RECENT MANAGEMENT ADVICE: STECF consider that the results of the most recent assessment conducted during the STECF-SGRST Working Group in Brest in July 2009 are not sufficiently reliable to use as the basis for quantitative management advice on fishing opportunities for 2010. In the absence of an allocation key for the international sprat catches, STECF is unable to advice on a specific EU TAC for sprat in the Black Sea. However, and in line with the advice given in STECF plenary report in 2009, STECF consider that the state of the stock in not known exactly but that the stock biomass is low compare to historical level.

STECF COMMENTS: The most recent assessment was rejected by STECF as a basis for advice on fishing opportunities for 2010 because of unreliable catch data and poor model fit.

FISHING OPPORTUNITIES FOR 2010 ACCORDING TO ANNEX II OF COM (2009) 224

With the background of the latest scientific assessments and advice and with reference to the Communication from the Commission (COM (2009) 224) on a consultation on fishing opportunities for 2010, STECF notes that Sprat in the Black Sea can be classified under Category 6.

Accordingly STECF notes that the rules for the above categories imply the following option for TAC in 2010.

	2010 TAC	Basis
Category 6	NE*	No EU-TAC set for this stock.

* NE- not estimable

19.3. Other Black Sea stocks (anchovy, mackerel, bonito, whiting and red mullet)

STECF is presently unable to advise on the state of resources or on fishing opportunities for 2010 for these stocks.

20. Highly migratory fish (Atlantic and Mediterranean)

ICCAT is the RFMO directly responsible for the management of tuna and tuna-like species in the Atlantic Ocean, the Mediterranean Sea and the Black Sea. Along with these species, ICCAT is also responsible for all the other species taken as a by-catch in the tuna fisheries. This is the reason why this section includes not only the tuna and tuna-like species, but also the pelagic elasmobranch species that have been considered by the ICCAT-SCRS report in 2009.

The ICCAT Convention states that the stocks should be managed at MSY. F_{MSY} is thus probably the most appropriate fishing mortality-based target reference point, whereas the corresponding B_{MSY} is only appropriate as a target in an average or equilibrium sense. For this reason ICCAT, like most of the tuna commissions, have not defined any precautionary reference points for these stocks.

20.1. Bluefin (*Thunnus thynnus*), Eastern Atlantic and Mediterranean

FISHERIES: East Atlantic bluefin tuna is under a quota regime since 1998. Declared catches in the East Atlantic and Mediterranean reached a peak of over 50,000 t in 1996 and then decreased substantially after the adoption of TAC. In 2006 and 2007, declared catches were about 30,647 and 34,514 t (in total for the East Atlantic and Mediterranean together) respectively. Preliminary and incomplete catch data for 2008 report a total of 23,868 t. Available information, however, indicates that landings have been seriously under-reported and the Standing Committee on Research and Statistics (SCRS) of ICCAT has estimated the total catch in 2006 and 2007 at about 50,000 t and 61,000 t, taking into account the fishing capacity. Estimates of catch entered into the Mediterranean cages were about 16,000 t in 2008, which appears to be consistent with the estimates of 2008 purse seine catch.

Available indicators from fisheries exploiting juvenile bluefin in the Bay of Biscay since the mid 1970s do not show any clear trends. This result is not particularly surprising because of strong inter-annual variation in year class strength. ICCAT-SCRS reports that qualitative information from eastern Atlantic fisheries since 2007, together with the preliminary results of aerial surveys in 2009 give consistent indications of higher abundance or higher concentration of small bluefin tuna in the north-western Mediterranean. This could reflect a positive outcome from the recent increase the minimum legal size, implemented under ICCAT Rec. 06-05 and/or recent recruitment success. Catch rate indicators from longliners and traps targeting large fish (spawners) in the Eastern Atlantic and the Mediterranean Sea also displayed a recent increase in cpue after a general decline since the mid-1970s

Bluefin tuna fisheries have been very active in the Mediterranean Sea and in the Black Sea since ancient times. The latest reported catches of bluefin tuna from the Black Sea are from the beginning of 1960's, but a few specimens were reported to have been caught there again in 2007, after more than 40 years of absence. The eastern bluefin stock is taken by a variety of vessels and types of fishing gears, with many landing sites located in many countries. The main gears are longline, trap and baitboat for the east Atlantic, and purse-seine, longline and traps for the Mediterranean. For EU Member States, driftnet fishing for tuna has been banned since January 1st 2002, while the ban entered into force in 2004 for all the other Contracting Parties to ICCAT, as well as the GFCM Member States, but a driftnet fishing activity is still officially permitted in Morocco. Recreational fishing may also be a relevant but unquantifiable source of fishing mortality on juvenile bluefin.

The rapid development of tuna farming in the Mediterranean Sea has induced further pressure on this stock and compounds the serious and well known problem of obtaining accurate catch data. Length compositions of the catches is affected by under-reported or over-quota components. Data on juvenile bluefin catches from the Mediterranean have not been available for many years, even though many fisheries targeting the first three age-groups occur in many areas. The lack of reliable data on juvenile catches has also compromised the ICCAT-SCRS assessments and advice for many years.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

PRECAUTIONARY REFERENCE POINTS: STECF notes that precautionary reference points have not been proposed for this stock and that biological reference points derived from the assessment are poorly defined. $F_{max} = 15,000$ t or less, $F_{0.1} = 8,500$ t or less. Long term yield approximated as the average of long term yield at F_{max} or $F_{0.1}$ over a broad range of scenarios = 50,000 t.

STOCK STATUS: ICCAT-SCRS stated in all its reports during the past 10 years that bluefin tuna data were unreliable and in 2009 indicted that without a significant and sustained effort at improved data, it is unlikely that

the ICCAT-SCRS could improve, in the near future, its scientific diagnosis and management advice. Nevertheless, the ICCAT-SCRS assessed the stock in 2008, as requested by the ICCAT, on the basis of 2007 data. The 2008 assessment results indicate that spawning stock biomass has been declining rapidly over recent years while fishing mortality has been increasing rapidly, especially for large bluefin. The increase in mortality for large bluefin tuna is consistent with an apparent shift in targeting towards larger individuals destined for fattening and/or farming. Analyses indicate that recent (2003-2007) SSB is less than 40% of the highest estimated levels. The decline in SSB appears to be more pronounced during more recent years. The results are consistent between different types of models and all the analyses indicate a general recent increase in F for large fish and, consequently, a decline in SSB.

Estimates of current stock status relative to MSY benchmarks are uncertain, but current F is most likely at least 3 times that which would result in MSY and SSB_{2007}/SSB_{msy} is most likely to be about 0.36 or less. The ICCAT-SCRS was unable to estimate F and SSB for 2008 and 2009 and no more-recent assessment is available.

RECENT MANAGEMENT ADVICE: In 2002, ICCAT fixed the TAC for the East Atlantic and Mediterranean bluefin tuna at 32,000 t per year for the period 2003 to 2006. The most recent ICCAT Rec. 08-05 established decreasing TACs: 29,500 t in 2007, 28,500 t in 2008, 22,000 t in 2009, 19,950 in 2010 and 18,500 t in 2011. However, Libya, Morocco and Tunisia were authorized to carry over into 2009 and 2010, their previous quota allocations that were not taken and Libya and Turkey disagreed with the allocation key accepted by other Contracting Parties to ICCAT and declared autonomous fishing quotas higher than their ICCAT allocation.

The available information indicated that the 2007 fishing mortality rate was, under the 2004-2007 overall fishing pattern, more than three times the level which would permit the stock to stabilize at the MSY level. The intention of [Rec. 06-05] and [Rec. 08-05] are seen as a step in the right direction, but as previously noted, the ICCAT consider that it is unlikely to fully fulfill the objective of the plan to rebuild the stock to the MSY level by 2023.

To address the various sources of uncertainties in the scientific diagnosis, especially regarding the data quality and availability, the ICCAT has investigated different quantitative approaches and it has considered a variety of scenarios for the projections. On this basis, the best advice of the ICCAT is currently to follow an $F_{0.1}$ (or another adequate FMSY proxy) strategy to rebuild the stock, because such strategies appear much more robust than [Rec. 06-05] and possibly to [Rec. 08-05] (according to preliminary analyses) to a wide range of uncertainties about the data, the current status and future productivity. These strategies would imply much lower catches during the next few years (on the order of 15,000 t or less), but the long-term gain could lead to catches of about 50,000 t with substantial increases in spawning biomass. For a long lived species such as bluefin tuna, it will take some time (> 10 years) to realize the benefit. The ICCAT further believes that a time area closure could greatly facilitate the implementation and the monitoring of such rebuilding strategies.

Clearly, an overall reduction in fishing effort and mortality, as stated in 2008, is needed to reverse current trends. The 2007 fishing capacity largely exceeds the 2007 TAC, but the 2008 catch capacity might be under 2008 TAC if illegal fishing did not occur. However, the potential catch capacity is clearly above TAC. Therefore, management actions need to be pursued to mitigate the impacts of overcapacity as well as to eliminate illegal fishing. Deferring effective management measures will likely result in even more stringent measures being necessary in the future to achieve the ICCAT objectives.

STECF COMMENTS: STECF agrees with the ICCAT-SCRS advice which corresponds to a total catch of 15,000 t or less for 2010.

STECF further notes that prior to 2008, poor or incomplete enforcement of adopted management plans has probably contributed to the current poor status of this stock, while the more stringent measures adopted by ICCAT Rec.08-05, if fully implemented and enforced should improve bluefin fishery management and benefit the stock. STECF recommends that management plans should take full account of the scientific advice and are adopted and fully implemented as a matter of urgency in all the bluefin tuna fisheries concerned.

STECF notes that existing fishing capacity, even after the reduction in 2009, exceeds that required to take catches of the level of recent TACs. STECF agrees with the ICCAT-SCRS that the minimum catch size should be set at 25 kg in order to avoid misreporting and/or discarded catches of mature fish between 25 kg and 30 kg.

STECF has noted the high degree of uncertainty surrounding much of the data used for the assessment of bluefin. Such uncertainty has been recognised by ICCAT-SCRS for a number of years and brings into question the reliability of the assessment as a basis for a realistic catch forecast. There remains an urgent need to have more reliable and complete size frequency data (particularly, but not only, for early year-classes 1 to 3) for the period following the introduction of a TAC in the Mediterranean. Tagging programs, fishery independent surveys and mining of historical data will all contribute to a better understanding of the status of this species and should be encouraged. STECF suggests that ICCAT should be encouraged to review its policy of using scientific data for compliance purposes, and that ICCAT task 2 data should be used for scientific purposes only. This may improve the availability, quality and reliability of data for stock assessment and provision of management advice.

STECF notes the recent publication of a new approach to bluefin tuna habitat mapping using daily sea surface chlorophyll and temperature from satellite remote sensors (Druon, 2009), which was presented during this meeting. The approach provides the possibility of identifying feeding and spawning habitats and is potentially a useful tool for real-time management of the fishery for bluefin, providing that data are correctly analysed and preliminary cross-checked with both scientific literature and fishery information. STECF considers that the approach is worthy of further consideration for a better understanding of the bluefin tuna movements in the Mediterranean and, possibly, for its management. A similar approach might be appropriate for other pelagic schooling species of commercial importance.

Special request on bluefin tuna

STECF is requested to address the following:

Based on the most recent information on stocks' status and management advice, STECF is requested to advise whether the stocks of bluefin tuna in the Atlantic Ocean and Mediterranean Sea are threatened with extinction

STECF response:

STECF notes that estimates of current stock status of the eastern Atlantic and Mediterranean bluefin tuna relative to MSY benchmarks are uncertain, but current F is most likely at least 3 times that which would result in MSY and SSB_{2007}/SSB_{msy} is most likely to be about 0.36 or less. STECF also notes that based on the most recent ICCAT SCRS assessment the stock biomass has the potential to increase given appropriate management. The ICCAT recommendations for future management is to follow a $F_{0.1}$ strategy which if adopted and fully implemented and enforced would imply much lower catches of the order of 15,000 t or less during the next few years, but the long term gain could lead to catches of about 50,000 t with substantial increases in spawning biomass. STECF concludes that if a $F_{0.1}$ strategy is followed, and providing appropriate management measures are implemented and rigorously enforced, the stock of bluefin tuna in the eastern Atlantic and Mediterranean has the potential to rebuild and is therefore not threatened with extinction.

20.2. Bluefin (*Thunnus thynnus*), Western Atlantic

FISHERIES: Western bluefin fisheries have been managed by TAC since the early eighties and catches were relatively stable around 2,500 t until 2001, increased in 2002 to 3,319 t and have been declining since then, reaching 1,624 t in 2007. In 2008, catches increased again to 2,015 t. Most of the catches are taken by vessels from the USA, Canada and Japan.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT. The latest stock assessment is from 2008.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The 2008 assessment was consistent with previous analyses in that spawning stock biomass (SSB) declined steadily between the early 1970s and 1992. Since then, SSB has fluctuated between 18% and 27% of the 1975 level. The stock has experienced different levels of fishing mortality (F) over time, depending

on the size of fish targeted by various fleets. Fishing mortality on spawners (ages 8 and older) declined markedly between 2002 and 2007. Estimates of recruitment were very high in the early 1970s, and additional analyses involving longer catch and index series suggested that recruitment was also high during the 1960s. Since 1977, recruitment has varied from year to year without trend. The Committee noted that a key factor in estimating MSY-related benchmarks is the highest level of recruitment that can be achieved in the long term. Assuming that average recruitment cannot reach the high levels from the early 1970s, recent F (2004-2006) is about 30% higher than the MSY level and SSB is about half of the MSY level. Estimates of stock status are more pessimistic if a high recruitment scenario is considered ($F/F_{MSY}=2.1$, $B/B_{MSY}=0.14$). The 2008 assessment results are similar to those from previous assessments.

One important factor in the recent decline of fishing mortality on large bluefin is that the TAC has not been taken during this time period, due primarily to a shortfall by the United States fisheries that target large bluefin. Two plausible explanations for the shortfall were put forward previously by the Committee: (1) that availability of fish to the United States fishery has been abnormally low, and/or (2) the overall size of the population in the Western Atlantic declined substantially from the level of recent years. While there is no overwhelming evidence to favour either explanation over the other, the 2008 base case assessment implicitly favours the first hypothesis (regional changes in availability) because a large recent reduction in SSB is not estimated. Nevertheless, the Committee notes that there remains substantial uncertainty on this issue and more research needs to be done.

The SCRS cautions that the conclusions of the 2008 assessment do not capture the full degree of uncertainty in the assessments and projections. An important factor contributing to uncertainty is mixing between fish of eastern and western origin. Limited analyses were conducted of the two stocks with mixing. Depending on the types of data used to estimate mixing (conventional tagging or isotope signature samples) and modelling assumptions made, the estimates of stock status varied considerably. However, these analyses are preliminary and more research needs to be done before mixing models can be used operationally for management advice. Another important source of uncertainty is recruitment, both in terms of recent levels (which are estimated with low precision in the assessment), and potential future levels (the "low" vs "high" recruitment hypotheses which affect management benchmarks). Finally, the growth curve assumed in the analyses may be revised based on new information that has been collected.

RECENT MANAGEMENT ADVICE: ICCAT-SCRS has conducted medium-term (12-year) outlook assuming two alternative recruitment scenarios with associated B_{MSY} (management target) values: (i) average levels observed for 1976-2004 and a lower value of B_{MSY} (ii) levels that increase as the stock rebuilds associated with a higher calculated value of B_{MSY} . The low recruitment scenario suggests that catch levels of 2,400 t will have about a 50% chance of rebuilding the stock by 2019 and catches of 2,000 t or lower will have greater than a 75% chance of rebuilding. If the high recruitment scenario is correct, then the western stock will not rebuild by 2019 even with no catch, although catches of 1,500 t or less are expected to immediately end overfishing (50% chance) and initiate rebuilding.

In 1998, the Commission initiated a 20-year rebuilding plan designed to achieve B_{MSY} with at least 50% probability. The 2008 assessment indicated that the stock had not yet rebuilt as projected under the plan initially. The 2007 SSB was estimated to be 7% below the level of the Plan's first year.

In 2008, the Commission recommended a total allowable catch (TAC), inclusive of dead discards, of 1,900 t in 2009 and 1,800 t in 2010 [Rec. 08-04]. These TAC levels were projected to have a 75% chance of meeting the lower rebuilding targets under the "low recruitment" scenario, but less than a 50% chance of meeting the higher target under the "high recruitment scenario". As noted in 2008, the TAC should be lower if the assessment is positively biased or if there is management implementation error (both of which have occurred in the past). Analyses conducted during the Joint ICCAT-Canada Precautionary workshop as well as two subsequent analyses reviewed by the Committee (SCRS/2008/089, SCRS/2008/175) suggested that the projections made during past assessments were too optimistic. This is reinforced by the observation that, halfway through the rebuilding program, biomass was still below what it was at the beginning. Accordingly, the Committee continues to strongly advise against an increase in TAC.

As noted previously by the Committee, both the productivity of western Atlantic bluefin and western Atlantic bluefin fisheries are linked to the eastern Atlantic and Mediterranean stock. Therefore, management actions taken in the eastern Atlantic and Mediterranean are likely to influence the recovery in the western Atlantic, because even small rates of mixing from East to West can have significant effects on the West due to the fact that Eastern plus Mediterranean resource is much larger than that of the West.

STECF COMMENTS: STECF agrees with the advice from ICCAT-SCRS, and stresses the relevance of archival tagging and biological investigations, to better understand the stock mixing problem.

STECF notes that it may seem counterintuitive, that a model with lower recruitment manages to achieve Bmsy by 2019, whilst higher recruitment on the basis of a stock recruitment relationship does not reach Bmsy by the same date. However the simulations suggest the later scenario has a higher SSB in 2019 than the earlier one, but also a much higher reference level (Bmsy) due to the increased recruitment at the higher SSBs compared to the constant recruitment assumption. Consequently, for the model assuming a stock recruit relationship, the time to reach Bmsy requires significantly longer than a single generation.

STECF, even for the western bluefin tuna stock, notes the high uncertainty of the assessment, along with the urgent need to revise some fundamental biological and ethological parameters used as inputs for the model.

Special request on bluefin tuna

STECF is requested to address the following:

Based on the most recent information on stocks' status and management advice, STECF is requested to advise whether the stocks of bluefin tuna in the Atlantic Ocean and Mediterranean Sea are threatened with extinction

STECF response:

STECF notes that estimates of current stock status of the western Atlantic stock indicate that the stock is well below that which would support MSY and that current exploitation rates are well above F_{MSY} . Based on the most recent ICCAT-SCRS report on bluefin tuna (Doc. No. PA2-604 / 2009), STECF notes that the western bluefin stock has the potential to rebuild given appropriate management. The report states *“If there is perfect implementation of [Rec. 08-04] through the year 2019, projections indicate that it is almost certain that the stock will be higher in 2019 than it is in 2009 for both recruitment scenarios considered”*. Given that the stock has the potential to rebuild if ICCAT Rec. 08-04 is implemented and rigorously enforced, STECF concludes that the western Atlantic bluefin stock is not threatened with extinction

20.3. Albacore (*Thunnus alalunga*), North Atlantic Ocean

FISHERIES: The northern stock is exploited by surface fisheries targeting mainly immature and longline fisheries targeting immature and adult albacore. The main surface fisheries are carried out by EC fleets (Ireland, France, Portugal and Spain) in the Bay of Biscay, in the adjacent waters of the northeast Atlantic, and in the vicinity of the Canary and Azores Islands in summer and fall. The main longline fleet is the Chinese Taipei fleet which operates in the central and western North Atlantic year round.

Landings of Northern Albacore remained relatively stable at around 35,000 t/year between 1984 to 2000. Catches decreased to a low of 22,741 t in 2002 (primarily due to a decrease in catches in the surface fishery) and increased again thereafter, reaching a peak of 36,199 t in 2006. Total catch in 2008 was 20,359 t representing a decrease on the 2007 yield and the 2006 peak catch (36,989 t) and is the lowest catch recorded in recent decades. The surface fisheries accounted for the bulk of the total catch with 17,861 t reported in 2008 (88%).

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT. The most recent assessment for North Atlantic albacore was undertaken in 2009.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Based on the 2009 assessment (which includes catch and effort since the 1930s and size frequency since 1959), ICCAT-SCRS consider that spawning stock has declined and is currently about one third of the peak levels estimated for the late 1940s. Estimates of recruitment to the fishery, although variable, have shown generally higher levels in the 1960s and earlier periods with a declining trend thereafter until 2007. The most recent recruitment is estimated to be the lowest for all the years of the evaluation although the magnitude of this year-class is highly uncertain in the latest year. The 2009 assessment indicates that the stock has remained below B_{MSY} (current SSB_{2007} is approximately 62% of SSB at MSY) since the late 1960's.

Corresponding fishing mortality rates have been above F_{MSY} (current ratio F_{2007}/F_{MSY} is 1.05 which is only slightly higher than F_{MSY}).

The trajectory of fishing mortality and spawning stock biomass relative to MSY reference points, indicate the northern albacore stock may have been overfished ($SSB/SSB_{MSY} < 1$) since the mid-1980s.

RECENT MANAGEMENT ADVICE: In 1998 ICCAT limited fishing capacity (number of vessels) in this fishery to the average of 1993-1995; this recommendation remains in force. In 2001 ICCAT established a total allowable catch of 34,500 t for this stock: in 2003 this was extended to 2007. However reported catches for 2005 and 2006 (35,318 and 36,989 respectively) exceeded the TAC whereas the 2007 catch (21,863) were well below the TAC.

In 2007, ICCAT established a new TAC for 2008 and 2009 of 30,200 t. Reported catch for 2008 (20,225) is well below the TAC.

The 2009 ICCAT/SCRS assessment indicates that constant catches above 28,000 t will not result in stock rebuilding to MSY by 2020. In view of the 2009 assessment, and in order to achieve the ICCAT management objective by 2020, a level of catch of no more than 28,000 t is advised.

STECF COMMENTS: STECF interprets the advice from ICCAT to imply that constant catches below 28,000 t will achieve the ICCAT conservation objective of achieving BMSY by 2020. If this interpretation is correct, STECF agreed with the ICCAT-SCRS advice that catches should be restricted to no more than 28,000 t.

20.4. Albacore (*Thunnus alalunga*), South Atlantic Ocean

FISHERIES: Recent South Atlantic albacore landings can largely be attributed to four fisheries; surface baitboat fleets from South Africa and Namibia, and longline fleets of Brazil and Taiwan.

The surface fleets are entirely albacore directed and mainly catch juvenile and sub-adult fish (70-90 cm FL). These surface fisheries operate seasonally, from October to May, when albacore are available in coastal waters. Brazilian longliners target albacore during the first and fourth quarters of the year, when an important concentration of adult fish (> 90 cm) is observed off the northeast coast off Brazil. The Taiwanese longline fleet operates over a larger area and throughout the year, and consists of vessels that target albacore and vessels that take albacore as by-catch, in bigeye directed fishing operations. On average, the longline vessels catch larger albacore (60-120 cm) than the surface fleets.

Total reported albacore landings in 2008 were 18,576; a decrease of about 1,500 t compared to the 2007 catch. The Taiwanese catch in 2008 was 9,966 t, a decrease of 3,180 t compared with 2007. This decrease is associated with the oil price rise in 2008 that saw a decrease in fishing effort targeting southern albacore.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT. The management is based on assessments of stock status using catch rates effort and size.

PRECAUTIONARY REFERENCE POINTS: Replacement yield is set at about 28,800 t (25,800-29,300 t), with a maximum sustainable yield estimated at 33,300 t (29,900-36,700 t).

STOCK STATUS: Based on the 2007 assessment which considers catch, size and effort since the 1950s, the view of the status of southern albacore stock is that the spawning stock has declined to about 25% of its unfished level in 2005. ICCAT concluded that it is likely that the stock was below the maximum sustainable yield (MSY): it was estimated to about 90% of B_{MSY} in 2005, while the 2005 fishing mortality rate was about 60% of F_{MSY} . MSY was estimated to be around 33,300 t, whereas the replacement yield averaged over the last 10 years, is approximately 29,000 t.

The outlook for the stock, based on the current assessment, is for SSB to increase from the levels estimated in 2005 over the next few years. This outlook assumes catches remain below the estimated replacement yield of 29,000 t

RECENT MANAGEMENT ADVICE: The first TAC for this stock was established by ICCAT in 1999 and for 2001 – 2003 the TAC was set at 29,200 t. In 2007, ICCAT recommended [Rec. 07-03] a catch limit of 29,900 t (the lowest estimate of MSY) until 2011. Catches in 2007 and 2008 (20,274 and 18,576 respectively) were well below this TAC.

The 2005 assessment indicates that this stock was overfished but that catches in the order of those seen in 2006 (24,452 t), would recover the stock. The observed 2008 catch of 18,902 t is well below the TAC, the 2006 catch, and the replacement yield (28,800 t).

ICCAT/SCRS considered that the current management regulations are sufficient for the recovery of the southern stock.

STECF COMMENTS: STECF agrees with the advice from ICCAT.

20.5. Albacore (*Thunnus alalunga*), Mediterranean Sea

FISHERIES: Albacore fishing is a traditional activity for a number of fleets in the Mediterranean including those of Cyprus, Greece, Italy, Spain, and Malta (France has a sporadic fishery entirely dependent upon the presence of the albacore in the Liguro-Provençal basin). ICCAT statistics, however, are considered quite incomplete since many years, due to unreported catches from several countries and the lack of data in some years from other countries. Even though catches of Mediterranean albacore have been increasing for the past few years, there is a lack of general information on this stock. The data from the fisheries are incomplete and biological information of the stock is limited. Reported albacore catches in the Mediterranean since 1982 have fluctuated between 1,235 t in 1983 and 7,894 t in 2003. The 2005 catches account only for 3,529 t, reaching 5,947 t in 2006. In 2007, the reported catches account 6,546 t and they were obtained mainly by long-lines (4,113t), other surface gears (1,400 t) and purse seines (1,033 t). STECF believes that even catches reported as “purse-seines” might be referred to other surface gears, including gillnets. EC-Italy has the highest catch in this fishery (4,017 t in 2007). Preliminary and incomplete catch reports in 2008 show only 2,586 t, again with Italy declaring the highest catch (2,104 t, equal to 81.3% of the provisional catch). Even if this figure is preliminary and incomplete, it is evident a strong reduction of catches in all those Countries reporting them. The annual average catch was 3,555 in the period 1983-2004 and 5,347 t in the period 2005-2007, showing an average increase of 50.4% when compared with the previous 22 year catches. The driftnet fishery for albacore has been banned since January 1st 2002 in the EC countries and from 2004 in all the ICCAT Mediterranean countries, but it is known that illegal fishing activity still occurs in some areas.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT and FAO/GFCM, through the ICCAT/GFCM expert consultation.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Due to the lack of adequate data, an assessment of the Mediterranean stock has never been carried out by the ICCAT. Many countries, are not yet reporting any catch for this species, and this fact is still preventing the assessment. However the Mediterranean stock does not show any general trend. The average size is almost stable. The mixing rate with the Atlantic stock appears to be insignificant.

RECENT MANAGEMENT ADVICE: The ICCAT-SCRS was not in a position to provide advice on the status of this stock due to the lack of information. An ICCAT meeting to revise the Mediterranean data is planned in spring 2010.

There are no ICCAT regulations directly aimed at managing the Mediterranean albacore stock.

STECF COMMENTS: STECF notes that data collection for this species is mandatory within the EC data collection framework. STECF additionally strongly supports the previous recommendation of the ICCAT/SCRS concerning the collation of historical data. STECF notes that catch data before 1995 are not representative of the removals at that time and in some cases no estimates are available for various countries. STECF notes that even a preliminary analysis of the data to examine trends for those fisheries having sufficient data series would potentially be useful.

20.6. Yellowfin (*Thunnus albacares*), Atlantic Ocean

FISHERIES: Yellowfin tuna are caught between 45°N and 40°S by surface (purse seine, baitboat, troll and handline) and sub-surface gears (longline). In contrast to the increasing catches of yellowfin tuna in other

oceans worldwide, there has been a steady decline in overall Atlantic catches, of 63% between 2001-2007. This was followed by a small increase of ~8% in 2008 (relative to 2007). Total recorded landings of YFT in 2008 were 107,277 t. The purse seine fishery is the major contributor to total catches of this species. Landings from baitboats and purse seiners generally declined between 2001-2007. Landings from other surface gears remained relatively stable. Landings from longliners fluctuated but remained relatively stable overall in this period. In 2008, landings increased somewhat, e.g. landings from the purse seine fleet increased by 35% in 2008 (relative to 2007). Of the total landings in 2008 the purse seine fisheries contributed 70,047 t (65%), long line catches were 20519 t (19%) and bait boat catches were 12525 t (12%). Baitboat catches declined markedly between 2001 and 2007, largely because of reduced catches by Ghana baitboats, which resulted from a combination of reduced days fishing, a lower number of operational vessels, and the observance of the moratorium on fishing using floating objects. There was a rise in catches from baitboats in 2008 (30% increase relative to 2007). In the western Atlantic, both purse seine catches and bait boat catches have declined strongly. However both in the east and west Atlantic longline catches have remains more or less stable in recent years. The observed increase in South African catches in the eastern Atlantic during 2005 and 2006 may be the result of a spillover of Indian Ocean fish caught just inside the Atlantic boundary.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The Atlantic YFT stock was assessed in 2008, at which time catch and effort data up to and including 2006 were available. Methods used were cohort analyses (VPA) and production models (ASPIC). The two models leave a small amount of uncertainty about the stock status. Results from VPA gave an (F_{2006}/F_{MAX}) of 0.84, and a relative biomass (B_{2006}/B_{MAX}) of 1.09. The estimates by the ASPIC were (F_{2006}/F_{MSY}) = 0.89 and (B_{2006}/B_{MSY}) = 0.83. ICCAT states that 2006 catches are estimated to be well below MSY levels, stock biomass is estimated to be near the Convention Objective and recent fishing mortality rates somewhat below F_{MSY} . The recent trends indicate declining effective effort and some recovery of stock levels. However, when the uncertainty around the point estimates from both models is taken into account, there is still about a 60% chance that stock status is not consistent with Convention objectives.

RECENT MANAGEMENT ADVICE: The status of yellowfin has shown some improvement since the last assessment, which is not surprising given the period of reduced catches and fishing effort. Currently, stock biomass is estimated to be near the Convention Objective and recent fishing mortality rates somewhat below F_{MSY} . Effort increases of the order of about 10% above current levels (in order to achieve MSY), would be expected in the long run to increase yield by only about 1-4% over what could be achieved at current effective effort levels. However, this would lead to a substantially increased risk of biomass falling below the Convention objective. In addition, the Commission should be aware that increased harvest of yellowfin could have negative consequences for bigeye tuna in particular, and other species caught together with yellowfin in fishing operations taking more than one species. The Committee also continues to recommend that effective measures be found to reduce fishing mortality of small yellowfin to increase long-term sustainable yield.

STECF COMMENTS: STECF notes that catches increased in 2008, which may represent the reversal of the previous period of declining catches. If catch rates continue to increase this reduces confidence that biomass will be somewhat above B_{MSY} .

ICCAT-SCRS noted that catch levels in recent years have been held in check, despite increasing efficiencies of individual vessels, by a continued decline in the number of purse seine vessels in the eastern Atlantic. STECF agrees that a continuation of the recent movement of additional newer vessels from the Indian Ocean into the Atlantic, with a corresponding increase in fishing mortality, the situation should be monitored closely to avoid adverse impacts on stock status.

20.7. Bigeye (*Thunnus obesus*), Atlantic Ocean

FISHERIES: Total landings in 2008 of Bigeye tuna in the Atlantic are currently estimated were around 70,000 t. Catches have been increasing from a low in 2006 (65,873 t) reaching 79,597 t in 2007, but still at much lower levels than in the 1990s. In the Atlantic this stock is exploited by three major gears/fisheries: longline, purse

seine and baitboat (live bait). In 2007, the last year of confirmed landings, total landings were distributed by these 3 fisheries as follows: 42,037 t (63%) by long line, 13150 t (17%) by purse seine and 11549 t (17%) by bait boats. The decline in total catches since 1999 is mainly due to declines in the long line catches.

The total annual catch increased up to the mid 1970s reaching 60,000 t and fluctuated over the next 15 years. In 1991, catch surpassed 95,000 t and continued to increase, reaching an historic high of about 132,000 t in 1994. Since 1999 reported and estimated catch has been declining and fell below 100,000 t in 2001, but appears to have stabilized at levels around 70,000t since then.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT. Although several types of assessment models, including production models, VPA, and a statistical integrated model (Multifan-CL) have been used, the results from non-equilibrium production models seem to me most consistent with previous assessments of Atlantic bigeye, and these models are thus used to provide our best characterization of the status of the resource.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Consistent with previous assessments of Atlantic bigeye, the results from non-equilibrium production models are used to provide our best characterization of the status of the resource. The current MSY estimated using two types of production models was around 90,000 t and 93,000 t, although uncertainty in the estimates broadens the range. In addition, these estimates reflect the current relative mixture of fisheries that capture small or large bigeye; MSY can change considerably with changes in the relative fishing effort exerted by surface and longline fisheries.

The biomass at the beginning of 2006 was estimated to be nearly 92% of the biomass at MSY and the 2005 fishing mortality rate was estimated to be about 13% below the fishing mortality rate at MSY. The replacement yield for the year 2006 was estimated to be slightly below MSY.

RECENT MANAGEMENT ADVICE: This assessment results indicated that the stock declined rapidly during the 1990s due to the large catches taken in that period, and recently it has stabilized at around or below the level that produces MSY in response to a large reduction in reported catches. Estimated fishing mortality exceeded FMSY for several years in the period of the mid-1990s and rapidly reduced since 1999. Projections indicate that catches reaching 85,000 t or less will permit the stock to rebuild in the future. The Commission should be aware that if major countries were to take the entire catch limit set under Recommendation 04-01 and other countries were to maintain recent catch levels, then the total catch could well exceed 100,000 t. The Committee recommends that the total catch does not exceed 85,000 t.

The assessment and subsequent management recommendations are conditional on the reported and estimated history of catch for bigeye in the Atlantic. The Committee reiterates its concern that unreported catches from the Atlantic might have been poorly estimated and continues this way, but available statistical data collection mechanisms are insufficient to fully investigate this possibility. Coordination amongst the tuna RFMOs should be encouraged, among other objectives, examining the possibility of ‘fish laundering’ for bigeye and other species.

STECF COMMENTS: STECF agrees with the advice from ICCAT/SCRS.

20.8. Swordfish (*Xiphias gladius*), North Atlantic

FISHERIES: Atlantic swordfish has a broad geographical distribution, (from 45°N to 45°S, both coastal and offshore) and is available to a large number of fishing countries. The largest proportion of Atlantic catches are made using surface drifting longlines, mostly by Spain, United States, Canada and Portugal. However, many additional gears are used. Since a 1987 peak in landings there was a decrease in estimated catches in the North Atlantic until 2002. This was in response to ICCAT recommendations but also attributed to shifts in fleet distributions, including movement of some vessels to the South Atlantic and out of the Atlantic.

For the past decade, the North Atlantic estimated catch (landings plus dead discards) has averaged about 11,332 t per year. The catch in 2008 (10,752) represents a 53% decrease since the 1987 peak in North Atlantic landings (20,236 t). These reduced landings have been attributed to ICCAT regulatory recommendations and shifts in

fleet distributions, including the movement of some vessels some years to the South Atlantic or out of the Atlantic. In addition, some fleets, including at least the United States, EC-Spain, EC-Portugal and Canada, have changed operating procedures to opportunistically target tuna and/or sharks, taking advantage of market conditions and higher relative catch rates of these species previously considered as by-catch in some fleets. Recently, socio-economic factors may have also contributed to the decline in catch.

The nominal catch rates by fleets contributing to the production model series have an increasing trend since the late 1990s, but the United States catch rates remained relatively flat. There have been some recent changes in United States regulations which may have impacted catch rates, but these effects remain unknown.

The most frequently occurring ages in the catch include ages 2 and 3. There are reports of increasing average size of the catch in some North Atlantic fisheries, including United States and Canada.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been defined for this stock.

STOCK STATUS: The estimated relative biomass trend in the base case model shows a consistent increase since 2000. The current results indicate that the stock is at or above BMSY. The relative trend in fishing mortality shows that the level of fishing peaked in 1995, followed by a decrease until 2002, followed by small increase in the 2003-05 period and downward trend since then. Fishing mortality has been below FMSY since 2005. The results suggest that there is greater than 50% probability that the stock is at or above BMSY, and thus the ICCAT rebuilding objective has been achieved.

However, it is important to note that since 2003 the catches have been below the TACs greatly increasing chances of a fast recovery. Overall, the stock was estimated to be somewhat less productive than the previous assessment, with the intrinsic rate of increase, r , estimated at 0.44 compared to 0.49 in 2006.

Other analyses conducted by the ICCAT-SCRS (Bayesian surplus production modeling, and Virtual Population analyses) generally support the results described for the base case surplus production model above.

RECENT MANAGEMENT ADVICE: ICCAT SCRS Advice for 2010: Consistent with the goal of the Commission's swordfish rebuilding plan [Rec. 96-02], in order to maintain the northern Atlantic swordfish stock at a level that could produce MSY with greater than 50% probability, the Committee recommends reducing catch limits allowed by Rec. 06-02 (15,345 t) to no more than 13,700 t. This reflects the current best estimate of maximum yield that could be harvested from the population under existing environmental and fishery conditions. Should the Commission wish to have greater assurance that future biomass would be at or above BMSY while maintaining F at or below FMSY, the Commission should select a lower annual TAC, depending on the degree of precaution the Commission chooses to apply in management.

The Committee noted that allowable catch levels agreed in [Recs. 06-02 and 08-02] exceeded scientific recommendations. The successful rebuilding of this stock could have been compromised if recent catches had been higher than realized.

STECF COMMENTS: STECF agrees with the advice from ICCAT.

STECF notes the concern expressed by ICCAT/SCRS that current regulations may have had a detrimental effect on the availability and consistency of data (catches, sizes, and CPUE indices) from the Atlantic fleet and the possible effects of this on future assessments.

STECF further notes that, because of the poor size-selectivity of longliners, regulating minimum landing size may inadvertently have resulted in under-reporting of juvenile catches. Alternative methods for reducing juvenile catches, such as time and/or area closures or technological changes in gear deployment, may be more effective and their utility should be further investigated.

20.9. Swordfish (*Xiphias gladius*), South Atlantic

FISHERIES: The historical trend of catch (landings plus dead discards) can be divided in two periods: before and after 1980. The first one is characterized by relatively low catches, generally less than 5,000 t (with an average value of 2,300 t). After 1980, landings increased continuously up to a peak of 21,930 t in 1995, levels that match the peak of North Atlantic harvest (20,236 t). This increase of landings was, in part, due to progressive shifts of fishing effort to the South Atlantic, primarily from the North Atlantic, as well as other waters. Expansion of fishing activities by southern coastal countries, such as Brazil and Uruguay, also contributed to this increase in catches. The reduction in catch following the peak in 1995 resulted from regulations and partly due to a shift to other oceans and target species. In 2008, the 11,108 t reported catches were about 51% lower than the 1995 reported level.

As observed in the 2006 assessment, the CPUE trend from targeted and non-targeted fisheries show different trends and high variability which indicates that at least some are not depicting trends in the abundances of the stock. It was noted that there was little overlap in fishing area and strategies between the by-catch and targeted fleets used for estimating CPUE pattern, and therefore the by-catch and targeted fisheries CPUE trends could be tracking different components of the population.

Since 1991, several fleets have reported dead discards. The volume of Atlantic-wide reported discards since then has ranged from 215 t to 1,139 t. The most recent (2008) reported level of dead discards is 244 t, a reduction of 79% from the peak level reported for 2000.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The results of the base case production model indicated that there were conflicting signals for several of the indices used. The model estimated overall index was relatively stable until the early 1980s when it started declining until the late 1990's and it reversed that trend about 2003. Estimated relative fishing mortality (F2008/FMSY) was 0.75 indicating that the stock is not being overexploited. Estimated relative biomass (B2009/BMSY) was 1.04, indicating that the stock was not overexploited.

Because of the high level of uncertainty associated with the south Atlantic production models results, the SCRS conducted catch-only modeling analysis, including two explorations using different assumptions concerning the intrinsic rate of population increase. The distribution for MSY was skewed for both runs. The median of MSY estimated for RUN 1 was 18,130 t and for RUN 2 was 17,934 t.

RECENT MANAGEMENT ADVICE: Until sufficiently more research has been conducted to reduce the high uncertainty in stock status evaluations for the southern Atlantic swordfish stock, the Committee emphasizes that annual catch should not exceed the provisionally estimated MSY (15,000). Considering the unquantified uncertainties and the conflicting indications for the stock, the Committee recommends a more precautionary Fishery Management approach, to limit catches to the recent average level (~15,000 t), which are expected to maintain the catch rates at about their current level.

STECF COMMENTS: STECF agrees with the advice from ICCAT. There is a need to evaluate the uncertainty concerning the stock structure of Atlantic swordfish. STECF notes the concern of ICCAT/SCRS that current regulations may have had a detrimental effect on the availability and consistency of scientific data on catches, sizes and CPUE indices of the Atlantic fleet and the possible effects for future assessments. STECF also notes that new minimum size regulations came into effect in 2007, but their effectiveness can not be assessed at present.

20.10. Swordfish (*Xiphias gladius*), Mediterranean Sea

FISHERIES: Swordfish fishing has been carried out in the Mediterranean using harpoons and driftnets since ancient times. Mediterranean swordfish fisheries are characterized by high catch levels with average annual

reported catches similar to those of larger areas such as the North Atlantic. Landings showed an upward trend from 1965-72, which become stabilised between 1973 and 1977, and then resumed an upward trend reaching a peak of about 20,000 t in 1988. Since then, the reported landings have declined and since 1990 they fluctuate from about 12,000 t to 16,000 t. The total 2006 reported catch is 14,893 t while 20007 reported catch is 14,227 t. Preliminary and incomplete 2008 reported catches are 11,153 t. The biggest producers of swordfish in the Mediterranean Sea in the recent years are, in the order, EC-Italy, EC-Greece, EC-Spain and Morocco. Also, Algeria, EC-Cyprus, EC-Malta, EC-Portugal, Tunisia and Turkey have fisheries targeting swordfish in the Mediterranean. Incidental catches of swordfish have also been reported by Albania, Croatia, EC-France, Japan, and Libya. There may be additional fleets taking swordfish in the Mediterranean, for example, Egypt, Israel, Lebanon, Monaco and Syria, but the data are not always reported. Prior to 2002 longlines and driftnets were the main gears used, but minor catches were also reported by harpoon, traps and sport fishing. The driftnet fishery for swordfish has been banned since January 1st 2002 in EU countries and from 2004 in all ICCAT Mediterranean countries (in Morocco the driftnet fishery is still permitted, within a progressive dismissing plan), but illegal fishing is known to still occur in various areas. The use of nets and longlines in sport and recreational fishery was banned from 2004 (ICCAT Rec. 04-12). ICCAT imposed a Mediterranean-wide one month fishery closure for all gears targeting swordfish in 2008. A two months closure was adopted for 2009, but only for pelagic longlines directly targeting swordfish (ICCAT Rec.08-03). Additionally, several countries have imposed technical measures, such as closed areas and seasons, minimum landing size regulations and license control systems. There is a high and growing demand for swordfish for fresh consumption in most Mediterranean countries.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT and GFCM through the joint GFCM/ICCAT working groups.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: In 2003 the SCRS carried out the first assessment of the Mediterranean stock based on fisheries data from the central and eastern Mediterranean. The most recent assessment was carried out in 2007.

The results from a workshop on stock structure in 2006 demonstrated that Mediterranean swordfish compose a separate stock to swordfish in the Atlantic but further research is needed to clearly define stock boundaries and the degree of any stock mixing. The stock assessment carried out in 2007 used two different methods. These gave a consistent view of declining stock abundance, but differed in the extent of the decline. Estimates of population status from production modelling using a longer time-series of catch and effort (a series for which SCRS has less confidence) indicated a 2005 stock level that was most likely about 13% below that necessary to achieve the ICCAT Convention objective while recent fishing mortality was about 25% above the level that would permit the stock to attain MSY levels. Estimates of stock status from virtual population analysis using a shorter time series of catch and effort data (for which ICCAT has more confidence), indicated about a 40% reduction in spawning stock level but a stable recruitment over the past 20 years. That spawning stock level is less than half that necessary to achieve the ICCAT Convention objective and estimates of recent fishing mortality rates from this form of assessment are more than twice that which, if continued without abatement, is expected to drive the spawning biomass to a very low level (about 10% SPR) within a generation. Those low levels are considered to give rise to non-negligible risks of rapid declines in the stock although such a signal has not yet been observed in the Mediterranean swordfish fisheries. While one modelling approach indicates the current stock status is only about 13% below B_{MSY} , it also indicates that future catches in excess of 12,000 t will not result in improvement in stock status. In contrast, the modelling approach that provides a more pessimistic view of current status (less than half B_{MSY}) indicates future catches that allow rebuilding are somewhat higher, up to about 14,000 t, assuming that the current high selectivity for juvenile fish continues and recruitment does not improve. The SCRS again noted the large catches of small size swordfish, i.e., less than 3 years old (many of which have probably never spawned) and the relatively low number of large individuals in the catches. Fish less than three years old usually represent 50-70% of the total yearly catches in terms of numbers and 20-35% in terms of weight. A reduction of the volume of juvenile catches would improve yield per recruit and spawning biomass per recruit levels.

RECENT MANAGEMENT ADVICE: SCRS has recommended that ICCAT should adopt a Mediterranean swordfish fishery management plan with the goal of rebuilding the stock to levels that are consistent with the ICCAT Convention objective. One technical measure the SCRS has thus far evaluated is Mediterranean – wide

fishing closures during the recruitment period, which could initiate rebuilding, depending on their duration and timing. Considering the estimated statistical uncertainty, gains in terms of landings and SSB from short fishery closures (e.g. one month) will be negligible. In contrast, relatively long (over three months) Mediterranean-wide closures in the last two quarters of the year would result in important long term gains, which are more profound in the case of SSB. The ICCAT convention objectives concerning SSB, however, can only be met with Mediterranean-wide drastic closures in the last two quarters of the year (i.e. six months). Such closures would result in short term decreases in landings. These effects would be diminished if closure is applied in months of low fishing activity (December-January). Following the results from recent studies, technical modifications of the longline fishing gears as well as the way they are operated can be considered as an additional technical measure in order to reduce the catch of juveniles. The SCRS recommends this type of measures be considered as part of a Mediterranean swordfish management plan. It is evident from the stock status evaluation that the current capacity in the Mediterranean swordfish fishery exceeds that needed to efficiently extract MSY. Management measures aimed at reducing this capacity should also be considered part of a Mediterranean swordfish management plan adopted by the ICCAT. In addition, future analyses of management measures should include economic aspects. Further, the SCRS recommends that national scientific delegations conduct additional research into technical measures and time-area closures which could optimize protection of juvenile Mediterranean swordfish. Given the uncertainty of the location of the boundary between the Mediterranean and North Atlantic stocks, it is important to identify the biological origin of those catches reported at or near the boundary so that the resulting knowledge can be considered in the management of the North Atlantic and/or Mediterranean stocks.

STECF COMMENTS: STECF notes that assessment models used by the ICCAT SCRS give different perceptions of the stock status in relation to B_{MSY} . While both models indicate that the biomass is below B_{MSY} , the degree to which the stock is overfished is substantially different in the two models. STECF agrees with the finding that the stock is overfished but is unable to quantify by how much it is overfished. Nevertheless, STECF broadly agrees with the advice from ICCAT regarding fishery closures and recommends that any fishery closure (no fishing with all surface longlines able to catch swordfish and eradication of all illegal driftnet fisheries) should apply to the entire Mediterranean area and extend for a minimum of two months. STECF notes that to achieve the ICCAT objectives for swordfish, the closure should be for a period greater than 2 months. STECF also recommends that fishing capacity for swordfish should not be allowed to increase and preferable that it be reduced. STECF also indicates the EU Data Collection framework should be adjusted to be consistent with the format used by ICCAT for assessment purposes, with particular attention to CPUE data. STECF again stresses the importance to better define the mixing rate between the Mediterranean and the Atlantic swordfish stock already known to occur in the Atlantic area close to Gibraltar.

20.11. Skipjack (*Katsuwonus pelamis*), Eastern Atlantic

FISHERIES: The total catches obtained in 2008 in the entire Atlantic Ocean were close to 149,000 t which represents the catch average of the last five years. The numerous changes that have occurred in the skipjack fishery since the early 1990s (such as the use of FADs and the expansion of the fishing area towards the west) have brought about an increase in skipjack catchability and in the proportion of the skipjack stock that is exploited. At present, the major fisheries are the purse fisheries, particularly those of EC-Spain, EC-France, NEI, Cape Verde, Guatemala and Ghana, followed by baitboat fisheries of Ghana, EC-Spain and EC-France. The preliminary estimates of catches made in 2008 in the East Atlantic amounted to 127,000 t, representing an increase of 3% as compared to the average of 2003-2007. The estimate of the average discard rate of skipjack tuna under FADs from data collected since 2001 by observers on-board Spanish purse seiners operating in the East Atlantic has been confirmed by the two new studies conducted on board French purse seiners (estimated at 42 kg per ton of skipjack landed). Furthermore, this last study showed that the amount of small skipjack (average size 37 cm FL) landed in the local market of Abidjan in Côte d'Ivoire as "*faux-poisson*" is estimated at 235 kg per ton of skipjack landed (i.e. an average of 6,641 t/year between 1988 and 2007).

In 2002 ICCAT reviewed the current stock structure hypothesis of two separate management units, East and West Atlantic, separated at 30°W. In recent years the East Atlantic fisheries have extended to the West of 30°, following the drift of FADs. This would imply the possibility of a certain degree of mixing.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Stock assessments for eastern and western Atlantic skipjack were conducted in 2008 using available catches to 2006. Skipjack had only been assessed previously in 1999. Although the fisheries operating in the east are extending towards the west beyond 30°W longitude, the SCRS decided to maintain the hypothesis in favor of two distinct stock units, based on available scientific studies. However, taking into account the biological characteristics of the species and the geographic distances between the various fishing areas, the use of smaller stock units continues to be the envisaged hypothesis.

A Bayesian method, using only catch information estimated the MSY (under a Schaefer-type model parameterization) at 143,000-156,000 t, a result which agrees with the estimate obtained by the modified Grainger and Garcia approach: 149,000 t.

In addition, two non-equilibrium surplus biomass production models (a multi-fleets model and a Schaefer-based model) were applied for 8 time series of CPUEs, and for a combined CPUE index weighted by fishing areas. To account for the average increase in catchability of purse seine fisheries, a correction factor of 3% per year was applied to the CPUE series. As for the bayesian model application that only uses catches, different working hypothesis were tested on the distribution of the priors of the two surplus production models (i.e., the growth rate, the carrying capacity, the catchability coefficient of each fleet, etc.). In general, the range of plausible MSY values estimated from these models (155,000-170,000 t) were larger than in the bayesian model based on catches. The Committee stated the difficulty to estimate MSY under the continuous increasing conditions of the exploitation plot of this fishery (one-way of the trajectory to substantially weaker effort values) and which as a result, the potential range distribution of some priors needs to be constrained (e.g., for growth rate, or for the shape parameter of the generalized model).

Although some caution is needed as regards to the generalization of the status to the overall stocks in the East Atlantic, due to the moderate mixing rates that seem to occur among the different sectors of this region, it is unlikely that skipjack be over exploited in the eastern Atlantic

MANAGEMENT MEASURES : The effects of the establishment of a time/area closure of the surface fishery [ICCAT Rec. 04-01], which replaces the old strata relative to the moratorium on catches under floating objects were analysed during the species Group meeting.

Considering that the new closed area is much smaller in time and surface than the previous moratorium time/area, and is located in an area which historically has lower effort anyway, this regulation is likely to be less effective in reducing the overall catches of small bigeye (the species for which the regulation was applied) by the surface fishery. When the fishing effort for the EC purse seine fleet was at its maximum value (period 1994-1996, i.e., before the implementation of the first moratorium), the skipjack catch from this fleet within the time and area limits defined by Rec. 04-01, was only on average at 7,180 t (i.e., 7.5% of the total skipjack catch from the EC purse seiners).

RECENT MANAGEMENT ADVICE: Although ICCAT/SCRS makes no management recommendations in this respect, catches should not be allowed to exceed MSY. The Commission should be aware that increasing harvests and fishing effort for skipjack could lead to involuntary consequences for other species that are harvested in combination with skipjack in certain fisheries.

STECF COMMENTS: STECF noted that the effect of the ICCAT decision to replace the previous moratorium on the use of FADs by a season/area closure was assessed and that the conclusion was that it is less efficient in reducing the overall catches of small bigeye and has only a marginal effect on skipjack catches.

20.12. Skipjack (*Katsuwonus pelamis*), Western Atlantic

FISHERIES: In the West Atlantic, the major fishery is the Brazilian baitboat fishery, followed by the Venezuelan purse seine fleet. Catches in 2008 in the West Atlantic amounted to 22,000 t, i.e. representing a decrease of 17% as compared to the trend observed for recent years. The catches taken by EU vessels on this stock have been, historically, negligible.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT.

PRECAUTIONARY REFERENCE POINTS: No reference points have been defined for this stock.

STOCK STATUS: Stock assessments for eastern and western Atlantic skipjack were conducted in 2008 using available catches to 2006. Skipjack had only been assessed previously in 1999. In 2002 the current stock structure hypothesis that consists of two separate management units, one in the East Atlantic and another in the West Atlantic, separated at 30°W was reviewed (see Skipjack, eastern Atlantic). The standardised CPUEs of Brazilian baitboats remain stable while that of Venezuelan purse seiners and USA rod and reel decreased in recent years. This decrease, also observed in the yellowfin CPUE time series, could be linked to specific environmental conditions (high surface temperatures, lesser accessibility of prey). The average weight of skipjack caught in the western Atlantic is higher than in the east (3 to 4.5 kg vs. 2 to 2.5 kg), at least for the Brazilian baitboat fishery.

Catch only model estimated MSY at around 30,000 t (similar to the estimate provided by the Grainger and Garcia approach) and the Bayesian surplus model (Schaefer formulation) at 34,000 t. Other analyses using Multifan-CL indicated MSY converges to about 31,000-36,000 t. It must be stressed that all of these analyses correspond to the current geographic coverage of this fishery (i.e., relatively coastal fishing grounds due to the deepening of the thermocline and of the oxycline to the East).

For the western Atlantic stock, in the light of the information provided by the trajectories of B/B_{MSY} and F/F_{MSY} , it is unlikely that the current catch is larger than the current replacement yield.

RECENT MANAGEMENT ADVICE: No management recommendations were proposed by the ICCAT.

STECF COMMENTS: No comment.

20.13. Marlins (*Makaira nigricans* and *Tetrapturus albidus*), Atlantic Ocean

FISHERIES: The ICCAT/SCRS used Task I catches as the basis for the estimation of total removals. In recent years large catches of billfish continue to be reported as unclassified billfish and reporting gaps remain for some important fleets. Total removals for the period 1990-2004 were obtained by modifying Task I values with the addition of blue marlin and white marlin that the SCRS estimated from catches reported as billfish unclassified. Additionally the reporting gaps were filled with estimated values for some fleets. In recent times new fleets have harvested large catches of blue marlin, including the artisanal FAD fisheries in the eastern Caribbean islands and a new artisanal fleet of small longliners operating off Brazil between 20°S and 26°S. During the 2006 marlin assessment it was noted that catches of blue marlin and white marlin continued to decline through 2004. Task I catches of blue marlin in 2006 were 2,182 t, reaching 3,082 t in 2007 and 3,484 t in 2008. Task I catches of white marlin in 2006 and 2007 were 385 t and 18 t, respectively, while they have been estimated 377 t in 2008. Task I catches of white marlin and blue marlin for 2008 are preliminary and incomplete, because they do not include reports from several important fleets, including some of the eastern Caribbean fleets that have reported large catches of blue marlin in the past. Historical reports of unclassified billfish remain an important issue in the estimation of historical removals from marlin stocks.

These species are primarily taken by longline fisheries (including various EU longline fisheries), but also by purse seines (including EU purse seiners catching a few hundreds tonnes yearly), by some artisanal gears which are the only fisheries targeting marlins (Ghana, Cote d'Ivoire, including EU ones in the Antilles) and also by various sport fisheries located in both sides of the Atlantic. This group of species, together with spearfish and sailfish, is becoming important in the Atlantic because of their charismatic status and the sport fisheries lobby (and because of the latter's active financial support to the ICCAT scientific researches on these species). The

increasing use of anchored FADs by various artisanal and sport fisheries is increasing the vulnerability of these stocks.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS:

BLUE MARLIN: No new information on stock status has been provided since the 2006 assessment. The recent biomass level most likely remains well below the B_{MSY} estimated in 2000. Current and provisional diagnoses suggest that F has recently declined and is possibly smaller than $F_{replacement}$ but larger than the F_{MSY} estimated in the 2000 assessment. Over the period 2001-2005 several abundance indicators suggest that the decline has been at least partially arrested, but some other indicators suggest that abundance has continued to decline. Confirmation of these recent apparent changes in trend will require at least an additional four or five years of data, especially since the reliability of the recent information has diminished and may continue to do so.

WHITE MARLIN: No new information on stock status has been provided since the 2006 assessment. The recent biomass most likely remains well below the B_{MSY} estimated in the 2002 assessment. Current and provisional diagnoses suggest that F is probably smaller than $F_{replacement}$ and probably also larger than the F_{MSY} estimated in the 2002 assessment. Over the period 2001-2004 combined longline indices and some individual fleet indices suggest that the decline has been at least partially reversed, but some other individual fleet indices suggest that abundance has continued to decline. Confirmation of these recent apparent changes in trend will require at least an additional four or five years of data, especially since the reliability of the recent information has diminished and may continue to do so.

RECENT MANAGEMENT ADVICE: The ICCAT-SCRS in 2008 asked the Commission, at a minimum, to continue the management measures already in place because marlins have not yet recovered. The Commission should take steps to assure that the reliability of the recent fishery information improves in order to provide a basis for verifying possible future rebuilding of the stocks. Improvements are needed in the monitoring of the fate and amount of dead and live releases, with verification from scientific observer programs; verification of current and historical landings from some artisanal and industrial fleets; and complete and updated relative abundance indices from CPUE data for the major fleets. Should the Commission wish to increase the likelihood of success of the current management measures of the marlin rebuilding plan, further reduction in mortality would be needed, for example by:

- implementing plans to improve compliance of current regulations,
- encouraging the use of alternative gear configurations, including certain types of circle hooks, hook/bait combinations etc., in fisheries where its use has been shown to be beneficial,
- broader application of time/area catch restrictions.

Given the recent importance of the catch from artisanal fisheries, and to increase the likelihood of recovery of marlin stocks, the Commission should consider regulations that control or reduce the fishing mortality generated by these fisheries.

The Commission should encourage continued research on development of methods to incorporate this information into stock assessments in order to provide a basis for increasing the certainty with which management advice can be provided.

STECF COMMENTS: STECF agrees with the advice from ICCAT. Furthermore, STECF stresses the need for correct identification and reporting of billfish species in all EU fisheries in accordance with to the DCF. Furthermore, STECF notes that the 2008 ICCAT-SCRS report indicated the potential for the stocks of blue marlin and white marlin to recover to the B_{MSY} level. However, recent increases in catches of blue marlin by artisanal fisheries in both sides of the Atlantic may compromise the effectiveness of the ICCAT plan.

20.14. Sailfish, *Istiophorus platypterus*, Atlantic Ocean

FISHERIES: Sailfish has a pan-tropical distribution. ICCAT has established, based on life history information on migration rates and geographic distribution of catch, that there are two management units for Atlantic sailfish, eastern and western.

Sailfish are targeted by coastal artisanal and recreational fleets and, to a less extent, are caught as by-catch in longline and purse seine fisheries. Historically, catches of sailfish were reported together with spearfish by many longline fleets. In 2009 these catches were separated by the Working Group. Historical catches of unclassified billfish continue to be reported to the Committee making the estimation of sailfish catch difficult. Catch reports from countries that have historically been known to land sailfish continue to suffer from gaps and there is increasing ad-hoc evidence of un-reported landings in some other countries. These considerations provide support to the idea that the historical catch of sailfish has been under-reported, especially in recent times where more and more fleets encounter sailfish as by-catch or target them.

Reports to ICCAT estimate that the Task I catch for 2008 was 1,274 t and 1,255 t, respectively, for the east and west region. Task I catches of sailfish for 2008 are preliminary because they do not include reports from all fleets.

The EU fleets reporting catches are EC-Spain (206 t in East Atlantic and 393 t in West Atlantic in 2008) and EC-Portugal (49 t in East Atlantic and 101 t in West Atlantic in 2008), while EC-United Kingdom and EC-France reports occasional catches in some years.

These species are primarily taken by longline fisheries (including various EU longline fisheries), but also by purse seines (including EU purse seiners catching a few hundred tonnes yearly), by some artisanal gears which are the only fisheries targeting marlins (Ghana, Cote d'Ivoire, including EU ones in the Antilles) and also by various sport fisheries located in both sides of the Atlantic. This group of species is becoming important in the Atlantic because of their charismatic status and the sport fisheries lobby (and because of the latter's active financial support to the ICCAT scientific researches on these species). The increasing use of anchored FADs by various artisanal and sport fisheries is increasing the vulnerability of these stocks.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: ICCAT recognizes the presence of two stocks of sailfish in the Atlantic, the eastern and western stocks. There is increasing evidence that an alternative stock structure with a north western stock and a south/eastern stock should be considered. Assessments of stocks based on the alternative stock structure option have not been undertaken to date, however, conducting them should be a priority for future assessments. In 2009 ICCAT conducted a full assessment of both Atlantic sailfish stocks through a range of production models and by using different combinations of relative abundance indices. It is clear that there remains considerable uncertainty regarding the stock status of these two stocks, however, many assessment model results present evidence of overfishing and evidence that the stocks are overfished, more so in the east than in the west. Although some of the results suggest a healthy stock in the west, few suggest the same for the east. The eastern stock is also assessed to be more productive than the western stock, and probably able to provide a greater MSY. The eastern stock is likely to be suffering stronger overfishing and most probably has been reduced further below the level that would produce the MSY than the western stock. Reference points obtained with other methods reach similar conclusions. Examination of recent trends in abundance suggests that both the eastern and western stocks suffered their greatest declines in abundance prior to 1990. Since 1990, trends in relative abundance conflict between different indices, with some indices suggesting declines, other increases and others not showing a trend. Examination of available length frequencies for a range of fleets show that average length and length distributions do not show clear trends during the period where there are observations.

Both the eastern and western stocks of sailfish may have been reduced to stock sizes below B_{MSY} . There is considerable uncertainty on the level of reduction, particularly for the west, as various production model fits indicated the biomass ratio B_{2007}/B_{MSY} both above and below 1.0. The results for the eastern stock were more pessimistic than those for the western stock in that more of the results indicated recent stock biomass below B_{MSY} . Therefore there is particular concern over the outlook for the eastern stock.

RECENT MANAGEMENT ADVICE: The ICCAT-SCRS in 2009 recommends that catches for the eastern stock should be reduced from current levels. It should be noted, however, that artisanal fishermen harvest a large

part of the sailfish catch along the African coast. The Committee recommends that catches of the western stock of sailfish should not exceed current levels. Any reduction in catch in the West Atlantic is likely to help stock re-growth and reduce the likelihood that the stock is overfished. It should be noted, however, that artisanal fishermen harvest a large part of the sailfish catch of the western sailfish stock.

The Committee is concerned about the incomplete reporting of sailfish catches, particularly for the most recent years, because it increases uncertainty in stock status determination. The Committee recommends all countries landing or having dead discards of sailfish, report these data to the ICCAT Secretariat.

STECF COMMENTS: STECF agrees with the advice from ICCAT, remarking the high uncertainty of the data and the assessment. Furthermore, STECF stresses the need for correct identification and reporting of billfish species in all EU fisheries in accordance with to the DCF.

20.15. Spearfish, Atlantic Ocean

FISHERIES: The generic common name Spearfish includes several species and, among them, at least *Tetrapturus angustirostris* (Shortbill spearfish, SSP), *Tetrapturus georgii* (Roundscale spearfish, RSP) and *Tetrapturus pfluegeri* (Longbill spearfish, SPF). The ICCAT/SCRS used Task I catches as the basis for the estimation of total removals. In recent years large catches of billfish continue to be reported as unclassified billfish and reporting gaps remain for many important fleets. The last SCRS report does not mention any spearfish, amount is largely incomplete and, then, underestimated.

These species are primarily taken by longline fisheries (including various EU longline fisheries), but also by purse seines (including EU purse seiners), by some artisanal gears (including EU ones in the Antilles) and also by various sport fisheries located in both sides of the Atlantic. The increasing use of anchored FADs by various artisanal and sport fisheries is possibly increasing the vulnerability of these stocks.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: unknown.

RECENT MANAGEMENT ADVICE: None. In 2008, the SCRS recommended all countries landing or having dead discards of spearfish report these data by species to the ICCAT Secretariat.

STECF COMMENTS: STECF remarks that these species have been apparently forgotten in the last SCRS report and that data on catches in ICCAT Task I appear mixed-up among several species. STECF is concerned about the lack of attention about these species, because they might present the same problems of other billfish species. STECF recommends that all these species should be accurately monitored, particularly for the EU fleets within the EC data collection framework. In the absence of any official figure at least of the catch by species, STECF is not in the position to provide any management comment.

20.16. Mediterranean Spearfish (*Tetrapturus belone*)

FISHERIES: The Mediterranean fisheries catch mostly one species among sailfish and spearfish, the Mediterranean Spearfish (*Tetrapturus belone*), usually a by-catch in longline and driftnet fishery, but one of the target species for the traditional harpoon fishery and occasionally in sport fishing activity, also taking into account the high market price. Catches are unofficially known to occur in all the Mediterranean States where driftnet and longline fishing is carried out. The landings are largely unknown, although they seem to have increased in the most recent years, certainly over a level of about 100 t, even considering that only a very few Countries (Italy, Spain and Portugal) are reporting their catches to ICCAT. In 2005 and 2006 catches have shown fluctuation, while the geographic distribution of the species seems to be affected by the oceanographic situation. EC-Italy reported a total catch of 266 t in 2008, while data for most of the countries are mixed up among billfish species (BIL) in the ICCAT Task I data. Other billfish and spearfish species are only very rarely present in most of the Mediterranean sea, but recent data show that catches could occur with a relative higher frequency in the western and central basins. No additional information is available.

SOURCE OF MANAGEMENT ADVICE: The advisory body is the ICCAT.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No attempt has been made until now to analyse the status of the Mediterranean Spearfish, due to the lack of data from many fisheries.

RECENT MANAGEMENT ADVICE: ICCAT have not provided any kind of management recommendations for this stock.

STECF COMMENTS: While generally not a target species for commercial fleets, spearfish and billfish catches, including those from the recreational fishery, should be monitored carefully. Catches of Mediterranean spearfish must be reported by all MS concerned, also according to the EC Data collection framework.

20.17. Small tunas (Black skipjack, Frigate tuna, Atlantic bonito, Spotted Spanish mackerel, King mackerel and others), Atlantic and Mediterranean

FISHERIES: There are over fourteen species within the ICCAT category of small tunas, which includes Blackfin tuna -BLF (*Thunnus atlanticus*), Bullet tuna - BLT (*Auxis rochei*), Frigate tuna - FRI (*Auxis thazard*), Atlantic Bonito - BON (*Sarda sarda*), Plain bonito - BOP (*Orcynopsis unicolor*), Serra Spanish mackerel – BRS (*Scomberomorus brasiliensis*), Cero - CER (*Scomberomorus regalis*), King mackerel - KGM (*Scomberomorus cavalla*), *Scomberomorus* unclassified - KGX (*Scomberomorus* spp.), Little tunny - LTA (*Euthynnus alletteratus*), West African Spanish mackerel - MAW (*Scomberomorus tritor*), Atlantic Spanish mackerel - SSM (*Scomberomorus maculatus*), Narrow-barred Spanish mackerel - COM (*Scomberomorus commerson*) and Wahoo WAH (*Acanthocybium solandri*), plus some vagrant species which includes the Indian mackerel (*Rastrelliger kanagurta*) and maybe also the Black skipjack – BKJ (*Euthynnus lineatus*) and Dogtooth tuna – DOT (*Gymnosarda unicolor*). Only five of these account for about 81% of the total catch by weight each year, according to the official statistics. In the '80s there was a marked increase in reported landings compared to previous years, reaching a peak of about 139,412 t in 1988. Reported landings for the 1989-1995 period decreased to approximately 92,637 t, and since then values have oscillated, with a minimum of 69,895 t in 1993 and a maximum of 123,600 t in 2005. Declared catches were 79,228 t in 2006 and 74,087 t in 2007. Overall trends in the small tuna catch may mask declining trends for individual species because annual landings are often dominated by the landings of a single species. These fluctuations seem to be partly related to unreported catches, as these species generally comprise part of the by-catch and are often discarded, and therefore do not reflect the real catch. A preliminary estimate of the total nominal landings of small tunas in 2008 is 55,876 t. The SCRS pointed out the relative importance of small tuna fisheries in the Mediterranean and the Black Sea, which account for 28% of the total reported catch in the 1980-2007. Several countries from the Mediterranean and Black Sea are not reporting catches to ICCAT. It is commonly believed that catches of small tunas are strongly affected by unreported or underreported data in all areas.

The 2008 preliminary catch amounted to 55,876 t, of which: 1,798 t of Blackfin tuna; 14,713 t of Bonito; 11,552 t of Little tunny; 35,26 t of Frigate tuna; 3,755 t of King mackerel; 5,900 t of Atlantic Spanish mackerel; 3,247 of Serra Spanish mackerel; 4,644 t of Wahoo, 6,018 t of Bullet tuna, 533 of Plain bonito, and 190 t of West-African Spanish mackerel.

Small tunas are exploited mainly by coastal fisheries and often by artisanal fisheries, although substantial catches are also made, either as target species or as by-catch, by purse-seiners, mid-water trawlers, handlines, troll lines, driftnets, surface drifting long-lines and small scale gillnets. Several recreational fisheries also target small tunas. Since 1991, the use of FADs by tropical purse-seiners may have led to an increase in fishing mortality of small tropical tuna species. The same fishing technique has been employed for a long time in the Mediterranean to catch dolphin fish (*Coryphaena hippurus*) but also small tunas; there are no statistics on these catches, even if it is known that the FAD fishery is now quite widespread in the Mediterranean according to the data provided to the ICCAT/GFCM joint expert working group in 2002. Data on the catch composition, biology and trends are now available from the Mediterranean and the Black Sea, thanks to the ICCAT/GFCM joint expert group in 2008. More information, particularly on specific fishing effort, is needed from all areas. The small tuna fishery seems to be quite important for the coastal communities, both economically and as a source of proteins.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, which operates also through the GFCM/ICCAT joint expert working group for the catches in the Mediterranean and the Black Sea.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: There is little information available to determine the stock structure of many small tuna species. The SCRS suggests that countries be requested to submit all available data to ICCAT as soon as possible, in order to be used in future meetings. Assessments of stocks of small tunas are also important because of their position in the trophic chain, where they are the prey of large tunas, marlins and sharks and they are predators of smaller pelagic species. It may therefore be best to approach assessments of small tunas from the ecosystem perspective. Generally, current information does not allow the SCRS to carry out an assessment of stock status of the majority of the species. Some analyses will be possible in future if data availability improves with the same trend of the latest year. Nevertheless, few regional assessments have been carried out.

The King mackerel in the Gulf of Mexico and South Eastern United States Atlantic, and the Spanish mackerel in the South Eastern US were assessed in 2008. During the period 2004-2007, the CRFM undertook assessments of the Serra Spanish mackerel, King mackerel and Wahoo fisheries operating within the South-Eastern Caribbean. Further progress in the CRFM assessments requires improvements in statistics and estimation of key biological parameters, as well as close collaboration with neighbouring non-CRFM countries sharing these fisheries within the sub-region.

RECENT MANAGEMENT ADVICE: No management recommendations have been presented by ICCAT due to the lack of proper data, historical series and analyses. ICCAT/SCRS, in 2008, reiterated its recommendation to carry out studies to determine the state of these stocks and the adoption of management solutions, with some priority species for the West African area: Atlantic bonito, Little tunny, Bullet tuna and West African Spanish mackerel. However, the information available for the major part of the stocks suggests that the majority of the stocks can be managed at the regional or sub-regional level. GFCM/ICCAT had identified some priority species, namely Bullet tuna, Atlantic bonito, Little tunny and Plain bonito. CRFM analyses of eastern Caribbean stocks have been limited by the quality and quantity of the available data, and in view of this, changes in current management approaches have not yet been recommended.

ICCAT-SCRS in 2009 noted that there is an improvement in the availability of catch and biological data for small tuna species particularly in the Mediterranean and the Black Sea. However, biological information, catch and effort statistics for small tunas remain incomplete for many of the coastal and industrial fishing countries. Given that, many of these species are of high importance to coastal fishermen, especially in some developing countries, both economically and often as a primary source of proteins, therefore the SCRS recommends that further studies be conducted on small tuna species due to the limits of information available.

STECF COMMENTS: STECF noted that several small tuna species have been included in the EC data collection framework and that this should possibly result in an improved availability of data in a few years, if properly implemented by the MS concerned. Independently from the small tuna species listed in the DCF, STECF recommends that fisheries and biological data be collected for all small tunas and not only those in the DCF.

20.18. *Luvarus (Luvarus imperialis)*, Mediterranean Sea

FISHERIES: The *Luvarus* is usually a species not considered among the catches of the Mediterranean fisheries, but this poorly known species regularly occurred as a commercial by-catch in several driftnet fisheries, particularly between May and June, when this fishing activity was largely practiced. Catches may be significant in some periods; individuals of this species can exceed 80 kg. A minor by-catch occurs even in long-line fisheries but data are usually not reported. To date landings have not been never officially reported by any Country, although this species commands a high price on the market.

SOURCE OF MANAGEMENT ADVICE: The advisory body is FAO/GFCM.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No attempt has been made until now to analyse the status of the *Luvarus* stock, due to the total lack of data. The ban on the use of driftnets by EC fleets since January 1st 2002 and from 2004 in all the ICCAT Mediterranean countries could result in a partially positive effect for the stock, even if illegal driftnet fishery is known to still occur in various areas.

RECENT MANAGEMENT ADVICE: GFCM have not provided any kind of management recommendations for this stock.

STECF COMMENTS: No comments.

20.19. Shortfin Mako (*Isurus oxyrinchus*), North Atlantic Ocean and Mediterranean.

FISHERIES: Shortfin mako sharks show a wide geographical distribution, most often between 50°N (60°N in NE Atlantic) and 50°S latitude, including the Mediterranean Sea.

The ICCAT-SCRS (2009) considered two separate stocks, one in the North Atlantic and one in the South Atlantic. According to the IUCN report in 2007, the shortfin mako in the Mediterranean is not considered as a sub-population and then, for the purpose of this report, it is considered as a part of the North Atlantic stock.

The shortfin mako in the North Atlantic is mostly taken by pelagic longlines, which account for more than 99% of the catches of this species reported to ICCAT in recent years. Catches in ICCAT Task I from North Atlantic range from 785 t in 1990 to a peak of 5,063 t in 2004 (but SCRS estimates about 7,000 t). Reported catches in 2007 are 3,915 t (but SCRS estimates a total of 5,996 t), while preliminary and incomplete catch reports in 2008 account 3,372 t. SCRS estimates were obtained during the 2008 assessment. EC fleets report the large majority of the catches: EC-Spain (1,895 t in 2008, equal to 48.4% of the total catch) and EC-Portugal (1,021 t in 2008), while occasional catches are reported by EC-United Kingdom,

In the Mediterranean Sea, this pelagic species is taken by a variety of fishing gears, always as by-catch, but it is rarely discarded as there is a market demand in the Mediterranean countries. Data on catches are extremely poor and largely incomplete, because many countries are not reporting them. On the basis of the most recent data reported by FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2006) and ICCAT, landings for this species in the Mediterranean are only reported by Spain (1997-2006), Portugal (2001-2006) and Cyprus (2006-2007). The catches ranged from 2 to 8 tonnes in the period 1997-2003. A sharp increase occurred in 2004 (33 t) and 2005 (17 t) mostly due to the catches reported by Portugal. In 2006 official catches were reduced to 10 t, decreasing to 2 t in 2007. Preliminary and incomplete reported catches in 2008 account only to 1 t.

A number of standardized CPUE data series for shortfin mako were presented in 2008 as relative indices of abundance. The ICCAT/SCRS placed emphasis on using the series that pertained to fisheries that operate in oceanic waters over wide areas.

SOURCE OF MANAGEMENT ADVICE: This species is under the ICCAT responsibility for the whole Convention area and for the catches obtained by the large pelagic fisheries. More general management advices can be provided by ICES and SAC-GFCM for all the other fisheries. IUCN also provides an advice on the conservation status.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: ICCAT- SCRS report in 2008 includes the assessment of the shortfin mako in the North Atlantic. For the North Atlantic, most model outcomes indicated stock depletion to about 50% of biomass estimated for the 1950s. Some model outcomes indicated that the stock biomass was near or below the biomass that would support MSY with current harvest levels above FMSY, whereas others estimated considerably lower levels of depletion and no overfishing. In light of the biological information that indicates the point at which BMSY is reached with respect of the carrying capacity which occurs at levels higher than for blue sharks and many teleost stocks. There is a non-negligible probability that the North Atlantic shortfin mako stock could be below the biomass that could support MSY. A similar conclusion was reached by the SCRS in 2004, and recent biological data show decreased productivity for this species.

The IUCN listed the shortfin mako as “Vulnerable” in 2007:

SCRS report in 2009 includes additional comments about the North Atlantic stock of shortfin mako. Ecological risk assessments (ERA) for eleven priority species of sharks (including shortfin mako) caught in ICCAT fisheries demonstrated that most Atlantic pelagic sharks have exceptionally limited biological productivity and, as such, can be overfished even at very low levels of fishing mortality. Specifically, the analyses indicated that

shortfin makos (together with other two species) have the highest vulnerability (and lowest biological productivity) of the shark species examined. All species considered in the ERA are in need of improved biological data to evaluate their biological productivity more accurately and thus specific research projects should be supported to that end. ERAs should be updated with improved information on the productivity and susceptibility of these species.

In the Mediterranean catches are inadequately reported or non-recorded, so data collected for the Mediterranean were not considered sufficient to conduct quantitative assessments for this species. At the same time, SCRS did not include the very low catches from the Mediterranean in its 2008 assessment.

RECENT MANAGEMENT ADVICE: ICCAT SCRS in 2009 did not provide any specific management recommendation for this stock. In general, precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. For example, minimum landing lengths or maximum landing lengths would afford protection to juveniles or the breeding stock, respectively, although other technical measures such as gear modifications, time-area restrictions, or other approaches, could be alternative means to protecting different life stages, provided they are tested for effectiveness through research projects before they are implemented.

STECF COMMENTS: The shortfin mako shark is listed in the Barcelona Convention (App. III) and in the Bern Convention (App. III). It is also considered a high priority species for GFCM. Even if in the Mediterranean it is listed by the IUCN as “Critically Endangered”, the STECF Plenary 02-09 clarified that this status cannot be justified according to the IUCN criteria, because there is no knowledge of a separate sub-population. As a consequence, the IUCN status to be considered is “Vulnerable”, which covers the Atlantic and the Mediterranean areas.

Due to the poor data available, STECF recommends better reporting of the shortfin mako catches from all the fisheries and Member States involved, with the purpose to assess the state of the resource and the possible impacts due to the different fisheries.

20.20. Shortfin Mako (*Isurus oxyrinchus*), South Atlantic Ocean.

FISHERIES: Shortfin mako sharks show a wide geographical distribution, most often between 50°N and 50°S latitude. The shortfin mako in the South Atlantic is mostly taken by pelagic longlines, which account for about 99% of the catches of this species reported to ICCAT in recent years. Catches in ICCAT Task I from South Atlantic range from 262 t in 1987 to a peak of 3,426 t in 2003 (but SCRS estimates about 5,900 t in 2000). Reported catches in 2007 are 2,716 t (but SCRS estimates a total of about 4,600 t), while preliminary and incomplete catch reports in 2008 account 1,690 t. SCRS estimates were obtained during the 2008 assessment. EC fleets report the large majority of the catches: EC-Spain (628 t in 2008, equal to 37,2% of the total catch) and EC-Portugal (321 t in 2008), while occasional catches are reported by EC-United Kingdom,

SOURCE OF MANAGEMENT ADVICE: This species is under the ICCAT responsibility for the whole Convention area for the large pelagic fisheries. IUCN also provides an advice on the conservation status.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Only one modeling approach could be applied to the South Atlantic shortfin mako stock, which resulted in an estimate of unfished biomass which was biologically implausible, and thus the Committee can draw no conclusions about the status of the South stock.

The IUCN listed the shortfin mako as “Vulnerable” in 2007:

RECENT MANAGEMENT ADVICE: ICCAT SCRS in 2009 did not provide any specific management recommendation for this stock. In general, precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. For example, minimum landing lengths or maximum landing lengths would afford protection to juveniles or the breeding stock, respectively, although other technical measures such as gear modifications, time-area restrictions, or other approaches, could be alternative means to protecting different life stages, provided they are tested for effectiveness through research projects before they are implemented.

STECF COMMENTS: Due to the poor data available, STECF recommends a better reporting of the shortfin mako catches from all the fisheries and Member States involved, with the purpose to assess the state of the stock and the possible impacts due to the different fisheries.

20.21. *Porbeagle (Lamna nasus)* in the North-East Atlantic

FISHERIES: Porbeagle is a highly migratory and schooling species. Sporadic targeted fisheries develop on these schools. Porbeagle fisheries are highly profitable. The main countries catching or having caught porbeagles are Spain and France. However in the past, important fisheries were prosecuted by Norway, Denmark and the Faeroe Islands. The only regular, target fishery that still exists is the French fishery. Several countries have sporadic fisheries taking porbeagles (which also takes occasional tope and blue sharks), in the North Sea, west of Ireland and Biscay, as they appear. These include Denmark, UK, and French vessels fishing to the south and west of England. Besides the pelagic fisheries, there is a by-catch by demersal trawlers from many countries, including Ireland, UK, France and Spain.

Existing EC management measures in the NE Atlantic include a TAC. Reported landings in 2008 were less than the TAC. A maximum landing length (210 cm fork length) was introduced in 2009 to deter fisheries targeting mature females.

According to the ICCAT catch table for the North Atlantic (including both NW and NE Atlantic), the portbeagle fishery ranged from a minimum of 470 t in 2006 to a maximum of 2,588 t in 1992. Recent catches for EU fleets are dominated by France (354 t in 2007 and 311 t in 2008), followed by Spain (8 t in 2007 and 41 t in 2008), Ireland (8 t in 2007 and 7 t in 2008) and Portugal (3 t in 2008), while Denmark, Germany, Netherlands and Sweden have only some occasional catch in the past. In the NE Atlantic there is a TAC of 436 t.

Given that catch reports to ICCAT are incomplete, the Committee attempted to develop a more accurate estimate of shark mortality and capture related to the Atlantic tuna fleets on the basis of the expected proportions among tunas and sharks and in the landings of these fleets as well as using shark fin trade data. These information sets were used to reconstruct plausible estimates of historic catches used in porbeagle assessment in 2009. According to this estimate, ICCAT considered that catches in NE Atlantic were in the order of 287 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on porbeagle in the Northeast Atlantic is usually ICES. There is no fishery-independent information on this stock. Landings data for porbeagle may be reported as porbeagle, or as ‘various sharks nei’ in the official statistics. This means that the reported landings of porbeagle are likely an underestimation of the total landing of the species from the NE Atlantic. Recently, due to the relevance of large pelagic catches, the management advice was provided by ICCAT/SCRS, after a joint ICCAT/ICES assessment.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for porbeagle in the Northeast Atlantic.

STOCK STATUS: The ICCAT-ICES sub-group in 2009 considered that there is a single-stock of porbeagle in the NE Atlantic that occupies the entire ICES area (sub-areas I-XIV). This stock extends from the Barents Sea to northwest Africa. For management purposes the southern boundary of the stock is 36°N and the western boundary at 42°W. Given that porbeagle abundance in the central Atlantic appears to be small, ICCAT region BIL94b is a reasonable approximation of NE Atlantic porbeagle stock area. Historic tagging studies and recent satellite tagging studies indicate that few, if any, porbeagles make transatlantic crossings.

Available information from Norwegian and Faroese fisheries shows that landings declined strongly and these fisheries ceased in the ICES area. These fisheries have not resumed, implying that the stock has not recovered, at least in the areas where those fisheries took place. The available information from the French fishery suggests that CPUE reached a peak in 1994 and afterwards has declined. The CPUE has been stable at a much lower level since 1996. ICES WG in 2009 stated that there is no evidence of mixing between the NE Atlantic and the Mediterranean.

In 2009, the ICCAT-ICES assessed the Northeast stock (including the Mediterranean). The Northeast Atlantic stock has the longest history of commercial exploitation. A lack of CPUE data for the peak of the fishery adds considerable uncertainty in identifying the current status relative to virgin biomass. Exploratory assessments indicate that current biomass is below BMSY and that recent fishing mortality is near or above F_{MSY} . Recovery

of this stock to B_{MSY} under no fishing mortality is estimated to take ca. 15-34 years. The current EC TAC of 436 t in effect for the Northeast Atlantic may allow the stock to remain stable, at its current depleted biomass level, under most credible model scenarios. Catches close to the current TAC (e.g. 400 t) could allow rebuilding to B_{MSY} under some model scenarios, but with a high degree of uncertainty and on a time scale of 60 (40-124) years.

Porbeagle is subject to the UN agreement on highly Migratory Stocks and the UK Biodiversity priority list. In IUCN, porbeagle is now classified as Critically Endangered for the depleted unmanaged population in the northeast Atlantic off Europe.

RECENT MANAGEMENT ADVICE: ICES (2008) recommended that, given the state of the stock, no targeted fishing for porbeagle should be permitted and bycatch should be limited. Landings of porbeagle should not be allowed.

Porbeagles are particularly vulnerable to fishing mortality, because the population productivity is low (long-lived, slowgrowing, high age-at-maturity, low fecundity, and a protracted gestation period) and they have an aggregating behavior. In the light of this, risk of depletion of reproductive potential is high. It is recommended that exploitation of this species should only be allowed when indicators and reference points for stock status and future harvest have been identified and a management strategy, including appropriate monitoring requirements has been decided upon and is implemented.

ICCAT-SCRS (2009) recommended that precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. Management measures should ideally be species-specific whenever possible. For example, minimum landing lengths or maximum landing lengths would afford protection to juveniles or the breeding stock, respectively, although other technical measures such as gear modifications, time-area restrictions, or other approaches, could be alternative means to protecting different life stages, provided they are tested for effectiveness through research projects before they are implemented. Both porbeagle stocks in the NW and NE Atlantic are estimated to be overfished, with the northeastern stock being more depleted. The main source of fishing mortality on these stocks is from non-ICCAT, directed porbeagle fisheries that are being managed by most of the relevant Contracting Parties through quotas and other measures.

The ICCAT-SCRS recommended that countries initiate research projects to investigate means to minimize by-catch and discard mortality of sharks, with a particular view to recommending to the ICCAT complementary measures to minimize porbeagle by-catch in fisheries for tuna and tuna-like species.

For porbeagle sharks, the SCRS recommends that the ICCAT work with countries catching porbeagle, particularly those with targeted fisheries, and relevant RFMOs to ensure recovery of North Atlantic porbeagle stocks. In particular, porbeagle fishing mortality should be kept to levels in line with scientific advice and with catches not exceeding current level. New targeted porbeagle fisheries should be prevented, porbeagles retrieved alive should be released alive, and all catches should be reported. Management measures and data collection should be harmonized among all relevant RFMOs, and ICCAT should facilitate appropriate communication.

STECF COMMENTS: STECF agrees with the ICES advice that no targeted fishing for porbeagle should be permitted. STECF also agrees with ICES and SCRS/ICCAT that it should be a requirement for all countries to document all catches of this species, to better define the situation of this stock.

STECF notes that the minimal amount of catches reported in the Mediterranean does not affect the assessment of the NE Atlantic stock, therefore considers the assessment to be appropriate for the NE Atlantic stock. However, STECF remarks that the situation of the NE Atlantic stock is very confused as concerns the Mediterranean area, because the porbeagles in this latter geographic area are sometimes included or excluded in the NE Atlantic stocks assessments, while the IUCN classification is different in the two areas. In the absence of a clear scientific evidence to support one or the other hypothesis, STECF recommends that this issue should be analysed in detail by the RFMOs concerned or by a specific working group.

20.22. Porbeagle (*Lamna nasus*) in the North-West Atlantic

FISHERIES: Northwest Atlantic porbeagles are largely concentrated in the waters on and adjacent to the continental shelf of North America. Observer data from the Canadian, U.S., Spanish and Icelandic fleets indicate that porbeagles are found throughout the high seas of the North Atlantic north of 35°N, but that the

CPUE on the high seas is relatively low. Conventional tagging data (~200 recaptures from three separate studies) indicate that NW Atlantic porbeagles are highly migratory within their stock area, but do not undertake trans-Atlantic migrations. More recent satellite tagging results reinforce this conclusion. Therefore the ICCAT sub-group concludes that there is a single stock of porbeagle in the NW Atlantic north of 35°N and west of 42°W, corresponding roughly to ICCAT region BIL94b and NAFO areas 0-6.

According to the ICCAT catch table for the North Atlantic (including both NW and NE Atlantic), the porbeagle fishery ranged from a minimum of 470 t in 2006 to a maximum of 2,588 t in 1992. The largest portion of the catches are obtained by surface longlines. Recent catches for EU fleets are dominated by France (354 t in 2007 and 311 t in 2008), followed by Spain (8 t in 2007 and 41 t in 2008), Ireland (8 t in 2007 and 7 t in 2008) and Portugal (3 t in 2008), while Denmark, Germany, Netherlands and Sweden have only some occasional catch in the past. Canada reports catches in the order of 124 t, all related to the NW Atlantic. There are two TAC established for the NW Atlantic porbeagle fishery: 185 t for the Canadian EEZ and 11.3 t for the USA.

Given that catch reports to ICCAT are incomplete, the Committee attempted to develop a more accurate estimate of shark mortality and capture related to the Atlantic tuna fleets on the basis of the expected proportions among tunas and sharks and in the landings of these fleets as well as using shark fin trade data. These information sets were used to reconstruct plausible estimates of historic catches used in porbeagle assessment in 2009. According to this estimate, ICCAT considered that catches in NW Atlantic were in the order of 144.3 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The main recent source of information and advice on porbeagle in the Northwest Atlantic is usually ICES. There is no fishery-independent information on this stock, except for the tagging data. Landings data for porbeagle may be reported as porbeagle, or as ‘various sharks nei’ in the official statistics. This means that the reported landings of porbeagle are likely an underestimation of the total landing of the species from the NE Atlantic. Recently, due to the relevance of catches taken by tuna and tuna-like fisheries, the management advice was provided by ICCAT/SCRS, after a joint ICCAT/ICES assessment.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been agreed for porbeagle in the Northeast Atlantic.

STOCK STATUS:

In 2009, the ICCAT/SCRS updated the Canadian assessment of the Northwest Atlantic porbeagle stock. The results indicate that biomass is depleted to well below B_{MSY}, but recent fishing mortality is below F_{MSY} and recent biomass appears to be increasing. Additional modelling using a surplus production approach indicated a similar view of stock status, i.e., depletion to levels below B_{MSY} and current fishing mortality rates also below F_{MSY}. The Canadian assessment projected that with no fishing mortality, the stock could rebuild to B_{MSY} level in approximately 20-60 years, whereas surplus-production based projections indicated 20 years would suffice. Under the Canadian strategy of a 4% exploitation rate, the stock is expected to recover in 30 to 100+ years according to the Canadian projections.

Porbeagle is subject to the UN agreement on highly Migratory Stocks. In IUCN (2004), porbeagle is classified as Endangered for the North West Atlantic.

RECENT MANAGEMENT ADVICE: ICCAT-ICES recommended that the ICCAT should adopt management measures that support the recovery objectives of the Canadian Management Plan. High-seas fisheries should not target porbeagle and all by-catch should be reported. Due to their lower abundance in the high seas, by-catch data collection and reporting would require scientific observer sampling at a high level of coverage.

Areas known to have high abundance of important life-history stages (e.g. mating, pupping and nursery grounds) should be subject to fishing restrictions. Such grounds are not exclusively in the Canadian EEZ. Increased effort on the high seas within the stock area could compromise stock recovery efforts.

ICCAT-SCRS recommended that precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. Management measures should ideally be species-specific whenever possible. For example, minimum landing lengths or maximum landing lengths would afford protection to juveniles or the breeding stock, respectively, although other technical measures such as gear modifications, time-area restrictions, or other approaches, could be alternative means to protecting different life stages, provided they are tested for effectiveness through research projects before they are implemented.

Both porbeagle stocks in the NW and NE Atlantic are estimated to be overfished. The main source of fishing mortality on these stocks is from non-ICCAT, directed porbeagle fisheries that are being managed by most of the relevant Contracting Parties through quotas and other measures. The ICCAT-SCRS recommended that countries initiate research projects to investigate means to minimize by-catch and discard mortality of sharks, with a particular view to recommending to the ICCAT complementary measures to minimize porbeagle by-catch in fisheries for tuna and tuna-like species. For porbeagle sharks, the SCRS recommends that the ICCAT work with countries catching porbeagle, particularly those with targeted fisheries, and relevant RFMOs to ensure recovery of North Atlantic porbeagle stocks. In particular, porbeagle fishing mortality should be kept to levels in line with scientific advice and with catches not exceeding current level. New targeted porbeagle fisheries should be prevented, porbeagles retrieved alive should be released alive, and all catches should be reported. Management measures and data collection should be harmonized among all relevant RFMOs, and ICCAT should facilitate appropriate communication.

STECF COMMENTS: STECF notes that management advices provided by ICCAT/ICES and by ICCAT/SCRS are partly different. STECF agrees with the specific measures indicated by ICCAT/ICES and underline the requirement for all countries to document all incidental by-catches of this species.

20.23. Porbeagle (*Lamna nasus*) in the South-West Atlantic

FISHERIES: Like in other areas, this pelagic species is sometimes caught by several fishing gears as by-catch, but it is usually retained on board and sold on the market for its good price. The high commercial value (in target and incidental fisheries) of mature and immature age classes makes this species highly vulnerable to over-exploitation and population depletion.

According to the ICCAT catch table for the South Atlantic (including both SW and SE Atlantic), the portbeagle fishery ranged from a minimum of 0 t in many years to a maximum of 91 t in 2008. The largest portion of the catches are obtained by surface longlines. Recent catches for EU fleets are dominated by Spain (5 t in 2007 and 4 t in 2008), while Bulgaria, Netherlands, Poland and Portugal have only some occasional catch in the past. The major catches are reported by Japan (47 t in 2008) and Uruguay (40 t in 2008), the latter certainly attributed to the SW Atlantic area.

Given that catch reports to ICCAT are incomplete, the Committee attempted to develop a more accurate estimate of shark mortality and capture related to the Atlantic tuna fleets on the basis of the expected proportions among tunas and sharks and in the landings of these fleets as well as using shark fin trade data. These information sets were used to reconstruct plausible estimates of historic catches used in porbeagle assessment in 2009. According to this estimate, ICCAT considered that catches in SW Atlantic were in the order of 164.6 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but this species is also under the responsibility of other RFMOs managing different fisheries.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The ICCAT-ICES subgroup in 2009 considered the distribution of the porbeagle stock in the SW Atlantic, south of 25°S and west of 20°W. It was suggested that it could apparently comprise waters of the southeast Pacific Ocean but more robust data are required to confirm this fact which would have direct implications on the management of this stock.

ICCAT/SCRS in 2009 stated that, in general, data for southern hemisphere porbeagle are too limited to provide a robust indication on the status of the stocks. For the Southwest stock, limited data indicate a decline in CPUE in the Uruguayan fleet, with models suggesting a potential decline in porbeagle abundance to levels below MSY and fishing mortality rates above those producing MSY. But catch and other data are generally too limited to allow definition of sustainable harvest levels. Catch reconstruction indicates that reported landings grossly underestimate actual landings.

RECENT MANAGEMENT ADVICE: For porbeagle sharks, the ICCAT/SCRS recommended that the ICCAT work with countries catching porbeagle, particularly those with targeted fisheries, and relevant RFMOs to prevent overexploitation of South Atlantic stocks. In particular, porbeagle fishing mortality should be kept to levels in line with scientific advice and with catches not exceeding current level. New targeted porbeagle

fisheries should be prevented, porbeagles retrieved alive should be released alive, and all catches should be reported.

STECF COMMENTS: STECF recommends a better reporting of the porbeagle catches from all the fisheries and Member States involved in the SW Atlantic area, with the purpose to provide a reliable assessment of the state of the resource and the possible impacts due to the different fisheries concerned.

20.24. Porbeagle (*Lamna nasus*) in South-East Atlantic

FISHERIES: This pelagic species is sometimes caught by several fishing gears as by-catch, but it is usually retained on board and sold on the market for its good price. Target fisheries were also reported since decades. The high commercial value (in target and incidental fisheries) of mature and immature age classes makes this species highly vulnerable to over-exploitation and population depletion.

According to the ICCAT catch table for the South Atlantic (including both SW and SE Atlantic), the portbeagle fishery ranged from a minimum of 0 t in many years to a maximum of 91 t in 2008. The largest portion of the catches are obtained by surface longlines. Recent catches for EU fleets are dominated by Spain (5 t in 2007 and 4 t in 2008), while Bulgaria, Netherlands, Poland and Portugal have only some occasional catch in the past. The major catches are reported by Japan (47 t in 2008) and Uruguay (40 t in 2008), the latter certainly non attributed to the SE Atlantic area.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but this species is also under the responsibility of other RFMOs managing different fisheries.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The ICCAT-ICES sub-group in 2009 considered the distribution of the porbeagle stock in the SE Atlantic, south of 25°S and east of 20°W. It was suggested that it could apparently comprise waters of the southwest Indian Ocean but more robust data are required to confirm this fact which would have direct implications on the management of this stock. There is belief that catches made in the southwestern Indian Ocean impact the SE Atlantic porbeagle stock which should be taken into consideration into future assessments.

Neither the ICCAT/ICES sub-group in 2009 nor the ICCAT/SCRS 2009 provided any assessment for this stock, possibly because of the lack of sufficient data and information.

RECENT MANAGEMENT ADVICE: The ICCAT/SCRS 2009 recommended that the ICCAT work with countries catching porbeagle, particularly those with targeted fisheries, and relevant RFMOs to prevent overexploitation of South Atlantic stocks.

STECF COMMENTS: STECF recommends a better reporting of the porbeagle catches from all the fisheries and Member States involved, with the purpose to assess the state of the resource and the possible impacts due to the different fisheries.

20.25. Porbeagle (*Lamna nasus*) in the Mediterranean Sea

FISHERIES: This pelagic species is sometimes caught by some fishing gears as by-catch, but it is usually retained on board and sold on the market for its good price. The high commercial value (in target and incidental fisheries) of mature and immature age classes makes this species highly vulnerable to over-exploitation and population depletion. Finning is not usually carried out in the Mediterranean.

Data on catches are extremely poor. On the basis of the most recent data reported by FAO-GFCM Capture Fisheries Production Dataset (Fishstat, 1970-2008) and ICCAT, landings of this species in the Mediterranean are only reported by Albania, Spain, Italy and Malta. The total yearly landings were very low, amounting to around 1 t with a peak of 4 tonnes in 2006. Reported catches in 2008 account only 2 t. However, even if the total quantity possibly taken annually is low, these catches appear to be underestimated due to the misreporting or not-reporting by some States.

SOURCE OF MANAGEMENT ADVICE: The advisory body is SAC-GFCM, but this species is also under the ICCAT responsibility.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The Mediterranean was considered as a separate management unit for this species for a number of years, even in the absence of a precise identification of the stock. IUCN (2007) considered the porbeagle in the Mediterranean as a sub-population and the ICES WG in 2009 stated that there is no evidence of mixing between the NE Atlantic and the Mediterranean.

In 2009, the very recent ICCAT/SCRS attempted an assessment of the Northeast Atlantic porbeagle stock, including the Mediterranean.

The porbeagle shark is considered globally as a Vulnerable species and the IUCN (2007) had confirmed this status for the Mediterranean sub-population. In 2009, the UNEP/MAP had proposed to assess the Mediterranean porbeagle as “Critically Endangered” (CR A2bd). The porbeagle shark in the Mediterranean is listed in the Barcelona Convention (App. III) and in the Bern Convention (App. III).

RECENT MANAGEMENT ADVICE: The ICCAT/SCRS 2009 recommended that the ICCAT work with countries catching porbeagle and relevant RFMOs to prevent overexploitation of porbeagle stocks.

STECF COMMENTS: STECF, in line with its Plenary 09-02 report, recommend that stock or sub-populations should be properly documented on scientific basis before including or excluding them in any specific assessment. For this reason, STECF remarks that the uncertainties created by IUCN, UNEP, ICES and ICCAT about the existence of a discrete Mediterranean stock of porbeagle need to be analysed and clarified if sufficient scientific information is available. Nevertheless, STECF recommends a better reporting of the porbeagle catches from all the fisheries and Member States involved, taking into account that this is a mandatory species within the EC data collection framework.

20.26. Blue shark (*Prionace glauca*) in the North Atlantic

FISHERIES: This species, having a wide distribution, is caught by several gears, but most of the catches are reported by pelagic longlines. It is a major by-catch and accessory species of European large pelagic fisheries. Blue shark accounts for more than 90% of all sharks caught by pelagic longlines. A number of standardized CPUE data series for blue shark were presented to ICCAT/SCRS in 2008 as relative indices of abundance.

Data on catches are partly or under-reported, particularly for some fleets. Historical catches range from 121 t in 1984 to 30,545 t in 2008. The major catches are reported by EC-Spain, with 20,788 t in 2008 (17,038 t in 2007), usually accounting for more than 60% of the total North Atlantic catches. Relevant catches are reported also by EC-Portugal with 6,167 t in 2008 (5283 t in 2007) and Japan with 1,921 in 2008 (2,696 t in 2007). Minor or occasional catches are also reported by several EC countries as France, Denmark, Ireland, Netherlands and United Kingdom.

Given that catch reports to ICCAT are incomplete, the Committee attempted to develop a more accurate estimate of shark mortality and capture related to the Atlantic tuna fleets on the basis of the expected proportions among tunas and sharks and in the landings of these fleets as well as using shark fin trade data. These information sets were used to reconstruct plausible estimates of historic catches used in blue shark assessment in 2009. According to this estimate, ICCAT considered that catches in North Atlantic were in the order of 61,845 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but data on this species is also possibly collected by other RFMOs.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Blue shark shows a wide geographical distribution, most often between 50°N and 50°S latitude. A characteristic of this species is usually their tendency to segregate temporally and spatially by size-sex, according to its respective processes of feeding, mating-reproduction, gestation and birth. Numerous aspects of the biology of this species are still poorly understood or completely unknown, particularly for some regions, which contributes to increased uncertainty in quantitative and qualitative assessments.

ICCAT/SCRS (2009) reported that ecological risk assessments for eleven priority species of sharks (including blue shark) caught in ICCAT fisheries demonstrated that most Atlantic pelagic sharks have exceptionally limited biological productivity and, as such, can be overfished even at very low levels of fishing mortality. All species considered in the ERA are in need of improved biological data to evaluate their biological productivity more accurately and thus specific research projects should be supported to that end.

For both North and South Atlantic blue shark stocks, although the results are highly uncertain, biomass is believed to be above the biomass that would support MSY and current harvest levels below FMSY. Results from all models used in the 2008 assessment were conditional on the assumptions made (e.g., estimates of historical catches and effort, the relationship between catch rates and abundance, the initial state of the stock in the 1950s, and various life-history parameters), and a full evaluation of the sensitivity of results to these assumptions was not possible during the assessment. Nonetheless, as for the 2004 stock assessment, the weight of available evidence does not support hypotheses that fishing has yet resulted in depletion to levels below the Convention objective.

The blue shark is subject to the UN agreement on highly Migratory Stocks. In IUCN (2007), the blue shark is classified as Near Threatened globally.

RECENT MANAGEMENT ADVICE: No specific management advice was provided by ICCAT/SCRS in 2009. Precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. Management measures should ideally be species-specific whenever possible.

STECF COMMENTS: STECF again recommends improving the data collection on the blue shark from all the fisheries and Member States involved, with the purpose of assessing the status of this stock. STECF notes that this species is a mandatory one in the EC Data collection framework.

20.27. Blue shark (*Prionace glauca*) in South Atlantic

FISHERIES: This species, having a wide distribution, is caught by several gears, but most of the catches are reported by pelagic longlines. It is a major by-catch and accessory species of European large pelagic fisheries. Blue shark accounts for more than 90% of all sharks caught by pelagic longlines. A number of standardized CPUE data series for blue shark were presented to ICCAT/SCRS in 2008 as relative indices of abundance.

Data on catches are partly or under-report with many countries non-reporting any catch. Historical catches range from 0 t in the '80s to 23,278 t in 2008. The major catches are reported by EC-Spain, with 8,942 t in 2008 (9,615 t in 2007), usually accounting for about 40% of the total South Atlantic catches. Relevant catches are reported also by EC-Portugal with 4,866 t in 2008 (4,493 t in 2007), Brazil with 1,986 t in 2008 (2,258 t in 2007), Namibia with 1,829 t in 2008 (no catches reported in 2007) and Japan with 1,945 t in 2008 (896 t in 2007). Minor or occasional catches are also reported by a few EC countries as Netherlands and United Kingdom.

Given that catch reports to ICCAT are incomplete, the Committee attempted to develop a more accurate estimate of shark mortality and capture related to the Atlantic tuna fleets on the basis of the expected proportions among tunas and sharks and in the landings of these fleets as well as using shark fin trade data. These information sets were used to reconstruct plausible estimates of historic catches used in blue shark assessment in 2009. According to this estimate, ICCAT considered that catches in South Atlantic were in the order of 37,075 t in 2008.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but data on this species is also possibly collected by other RFMOs.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: Blue shark shows a wide geographical distribution, most often between 50°N and 50°S latitude. A characteristic of this species is usually their tendency to segregate temporally and spatially by size-sex, according to its respective processes of feeding, mating-reproduction, gestation and birth. Numerous aspects of the biology of this species are still poorly understood or completely unknown, particularly for some regions, which contributes to increased uncertainty in quantitative and qualitative assessments.

ICCAT/SCRS (2009) reported that ecological risk assessments for eleven priority species of sharks (including blue shark) caught in ICCAT fisheries demonstrated that most Atlantic pelagic sharks have exceptionally limited biological productivity and, as such, can be overfished even at very low levels of fishing mortality. All species considered in the ERA are in need of improved biological data to evaluate their biological productivity more accurately and thus specific research projects should be supported to that end.

For both North and South Atlantic blue shark stocks, although the results are highly uncertain, biomass is believed to be above the biomass that would support MSY and current harvest levels below FMSY. Results from all models used in the 2008 assessment were conditional on the assumptions made (e.g., estimates of historical catches and effort, the relationship between catch rates and abundance, the initial state of the stock in the 1950s, and various life-history parameters), and a full evaluation of the sensitivity of results to these assumptions was not possible during the assessment. Nonetheless, as for the 2004 stock assessment, the weight of available evidence does not support hypotheses that fishing has yet resulted in depletion to levels below the Convention objective.

The blue shark is subject to the UN agreement on highly Migratory Stocks. In IUCN (2007), the blue shark is classified as Near Threatened globally.

RECENT MANAGEMENT ADVICE: No specific management advice was provided by ICCAT/SCRS in 2009. Precautionary management measures should be considered for stocks where there is the greatest biological vulnerability and conservation concern, and for which there are very few data. Management measures should ideally be species-specific whenever possible.

STECF COMMENTS: STECF again recommends improving the data collection on the blue shark from all the fisheries and Member States involved, with the purpose of assessing the status of this stock. STECF notes that this species is a mandatory one in the EC Data collection framework.

20.28. Blue shark (*Prionace glauca*) in the Mediterranean Sea

FISHERIES: This pelagic species (BSH) is often caught by several fishing gears, always as by-catch and sometimes marketed. Catches mainly come from large pelagic long-line fisheries targeting tuna fish and swordfish and small driftnet fisheries. It is a major by-catch and accessory species of European large pelagic fisheries. Blue shark accounts for almost 95% of all sharks caught by drifting longlines. A number of specimens may be also taken in large driftnet fisheries; (these nets have been banned since January 1, 2002 for the EU fleets and since 2004 in all the Mediterranean according to ICCAT and GFCM Recommendations). The driftnet fishery in the Alboran Sea by Moroccan vessels is reported catching large numbers of blue sharks (estimated at more than 26,000 individuals per year). Recently this species has increased in commercial value and incidental catches are now very rarely discarded in several areas, with the meat marketed in Greece, Italy (in some regions), Spain and in north-African countries and fins sometimes exported to Asia.

Data on catches exist but they are very partial and many countries are not reporting their catches (including Morocco). On the basis of the most recent data reported to ICCAT, landings for this species are reported by Spain, France, Cyprus, Italy, Malta, Japan and Portugal. The yearly landings ranged from 0 to 178 t in the period 1984-2008. In 2006, reported catches reached the historical maximum of 178 t. Reported catches are 51 t in 2007 and 80 t in 2008. The high catch is reported by EC-Italy, with 75 t in 2008 (46 t in 2007), followed by EC-Spain with 2 t and Malta with 2 t, while catches have been reported in the past also by EC-Portugal and EC-Cyprus.

SOURCE OF MANAGEMENT ADVICE: The advisory body is ICCAT, but this species is also under the GFCM responsibility.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The Mediterranean is considered to host a separate stock of blue shark and should be managed as a separate unit.

The blue shark is listed in the Barcelona Convention (Appendix III) and in the Bern Convention (Appendix III). In the Mediterranean it is listed as vulnerable (A3bd + 4bd), while the global population is listed as LR/nt (Lower Risk, near threatened) in the IUCN Red List.

RECENT MANAGEMENT ADVICE: Data must be collected in the ICCAT area.

STECF COMMENTS: STECF again recommends improving the data collection on the blue shark from all the fisheries and Member States concerned, with the purpose of assessing the status of this stock. STECF notes that this species is a mandatory one in the EC Data collection framework but the understanding of this stock cannot improve if non-EC countries will continue in non-reporting their catches to ICCAT or GFCM.

20.29. Thresher shark (*Alopias vulpinus*) in the Atlantic Ocean and the Mediterranean

FISHERIES: This pelagic species is sometimes caught by several fishing gears, always as by-catch, but it is often retained on board and sold on the market for its good price. In the Northern Adriatic Sea, in the Mediterranean, gillnets (often set for demersal species) also have a by-catch of *Alopias vulpinus* particularly in the summer. This species may be also taken in large driftnet fisheries, even though this fishery is prohibited in the Mediterranean since years. Surface long-line fisheries, that target tuna and tuna-like species in the Atlantic Ocean and the Mediterranean, also catch *A. vulpinus*.

Data on catches are extremely poor and are suspected to include other species belonging to the same genus.

Data on catches are largely not reported or under-reported, with several countries never reporting them. According to the ICCAT data base (ALV), catches ranged from a minimum of 2 t in 1993 to a maximum of 158 t in 2000, with 70 t reported in 2008. In 2008 the highest catch was reported by EC-Portugal with 53 t (98 t in 2007), while very minor catches were reported by a number of countries. Landings for this species in the Mediterranean are reported by Spain (1997-2006), Portugal (2001-2006), Italy and France (1999-2006), ranging from 3 to 21 t in the period 1996-2006.

Reported catches of unclassified thresher shark (*Alopias* spp., THR) ranged from a minimum of 6 t in 1986 to a maximum of 189 t in 1987, with 134 t reported in 2008. In 2008 the highest catch was reported by EC-Spain with 81 t, followed by USA with 48 t. Minor or occasional catches were historically reported also by other EC countries (Ireland, Portugal and United Kingdom).

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT (for the tuna and tuna-like fisheries) and all the relevant RFMOs (for all the other fisheries).

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: There is no mention of separate populations of this species, even if some WGs had considered the specimens living in the Mediterranean as a separate unit in the past. There is no assessment of the Atlantic and Mediterranean stock available, while conservation assessments have been conducted by IUCN in 2003 and 2007, defining this species as globally “Vulnerable”, besides the lack of catch data, incomplete knowledge of stock structure, and uncertainty over life history parameters which make it impossible to determine population size and fluctuations.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF recommends a better reporting of the Thresher shark catches from all the fisheries and Member States involved, with the purpose of better understanding the current state of the stock.

20.30. Bigeye thresher shark (*Alopias superciliosus*) in the Atlantic Ocean and the Mediterranean

FISHERIES: This pelagic species (BTH) is sometimes caught by several fishing gears, always as by-catch, but it is often retained on board and sold on the market for its good price. This species might be confused in the catch statistics with other thresher sharks.

Data on catches are extremely poor. According to the ICCAT data base, catches ranged from a minimum of 6 t in 1986 to a maximum of 189 t in 1987, with 134 t reported in 2008. The highest catch in 2008 was reported by EC-Spain with 81 t, followed by USA with 48 t, while very minor catches were reported by a some of countries, including EC-Ireland, EC-Portugal and EC-United Kingdom.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT (for the tuna and tuna-like fisheries) and all the relevant RFMOs (for all the other fisheries).

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: There is no evidence of separate populations of this species, There is no assessment of the Atlantic and Mediterranean stock available, while a conservation assessments was conducted by IUCN in 2007, defining this species as globally “Vulnerable”, besides the lack of catch data, incomplete knowledge of stock structure, and uncertainty over life history parameters which make it impossible to determine population size and fluctuations.

RECENT MANAGEMENT ADVICE: ICCAT Rec. 08-07 recommends CPCs shall require vessels flying their flag to promptly release unharmed, to the extent practicable, bigeye thresher sharks (*Alopias superciliosus*) caught in association with fisheries managed by ICCAT which are alive, when brought along side for taking on board the vessel. CPCs shall also require that incidental catches as well as live releases shall be recorded in accordance with ICCAT data reporting requirements.

STECF COMMENTS: STECF agrees with the ICCAT recommendation and recommends a better reporting of the bigeye thresher shark catches from all the fisheries and Member States concerned, with the purpose of better understanding the current state of the stock.

20.31. Smooth hammerhead (*Sphyrna zygaena*) in the Atlantic Ocean and the Mediterranean Sea

FISHERIES: The Smooth hammerhead (SPZ) is a relatively common and widespread shark, captured in a number of fisheries throughout its range, mostly by gillnet and pelagic long-line. There might be a significant mortality of this species in large-scale long-line and driftnet fisheries, although the impact on populations is unknown at present.

Data on catches are considered scarce, suspected to include other species belonging to the same genus and they are largely not reported or under-reported, with several countries never reporting them. According to the ICCAT data base, catches ranged from a minimum of 1 t in 1995 to a maximum of 1,472 t in 2002, with 109 t reported in 2008. The highest catch in 2008 was reported by Senegal (103 t), followed by Ivory Coast (which usually reports catches in the order of 40 t) and EC-Portugal (6 t), while very minor catches were historically reported by a number of countries, including EC-Spain, EC-Italy and EC-Malta.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT (for the tuna and tuna-like fisheries) and all the relevant RFMOs (for all the other fisheries).

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: There is no evidence of separate populations of this species, There is no assessment of the Atlantic and Mediterranean stock available, while a conservation assessments was conducted by IUCN in 2008, defining this species as globally “Vulnerable”; IUCN (2007) and UNEP/SPA (2008) had proposed a separate evaluation of this species in the Mediterranean, even in the absence of any evidence of a separate sub-population.

RECENT MANAGEMENT ADVICE: None. UNEP/SPA in 2008 proposed the inclusion of this species in the Annex II of the SPA/BD protocol of the Barcelona Convention.

STECF COMMENTS: STECF reiterates the concerns about the different classification of conservation status in various areas in the absence of any evidence of sub-populations, raised during the STECF Plenary 09-02. STECF recommends the collection of catch data and basic information on this species by the EU Member States to better understand the current situation of the stock.

20.32. Other Hammerhead sharks (*Sphyrnidae*) in the Atlantic Ocean and the Mediterranean Sea

FISHERIES: The hammerhead sharks are widespread species, captured in a number of fisheries throughout its range, mostly by gillnet and pelagic long-line. There might be a significant mortality of these species in large-scale long-line and driftnet fisheries, although the impact on populations is unknown at present.

Data on catches are considered scarce, not well defined by species, and they are largely not reported or under-reported, with several countries never reporting them. According to the ICCAT database, catches by species or category are the followings:

Sphyrna lewini (SPL): reported catches ranged from a minimum of 0 t in 2006/2007 to a maximum of 363 t in 1990, with only 1 t reported in 2008 by Venezuela. Historically, catches were reported also by EC-Spain.

Sphyrna tiburo (SPJ): reported catches are available only in 2004 with 77 t reported by USA.

Sphyrna mokarran (SPK): reported catches ranged from a minimum of 0 t in 2004 to a maximum of 19 t in 1992, with only 1 t reported in 2008 by St. Lucia. Historically, catches were reported also by EC-Spain.

Sphyrna spp. (SPN): reported catches ranged from a minimum of 0 t in 1992 to a maximum of 883 t in 1987, with 251 t reported in 2008 (incomplete report). The highest catch in 2008 was reported by Brazil (122 t), followed by USA (56 t), EC-Portugal (27 t) and Namibia (25 t), but EC-Spain, which usually accounts for about 50 to 70% of the catches, did not reported any catch till the recent ICCAT/SCRS 2009 meeting.

Sphyrnidae (SPY): reported catches ranged from a minimum of 47 t in 2004 to a maximum of 198 t in 2008. The highest catch in 2008 was reported by EC-Spain (198 t); Uruguay usually reports catches of these undefined sharks.

Catches of these species in the Mediterranean area are incidental.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are ICCAT (for the tuna and tuna-like fisheries) and all the relevant RFMOs (for all the other fisheries).

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: There is no evidence of separate populations of these species. There is no assessment of the Atlantic and Mediterranean stocks available, while a conservation assessments was conducted by IUCN in 2008, defining *Sphyrna lewini* and *Sphyrna mokarran* as globally “Endangered

RECENT MANAGEMENT ADVICE: None. UNEP/SPA in 2008 proposed the inclusion of *Sphyrna mokarran* and *Sphyrna lewini* in the Annex II of the SPA/BD protocol of the Barcelona Convention for the Mediterranean.

STECF COMMENTS: STECF reiterates the concerns about the different classification of IUCN status in various areas in the absence of any evidence of sub-populations, raised during the STECF Plenary 09-02. STECF recommends the collection of catch data and basic information on these species (possibly with a precise identification) by the EU Member States to better understand the current situation of the stocks.

20.33. *Carcharhinus* spp.

FISHERIES: This important group of pelagic species includes at least 17 species in the Atlantic Ocean, while only 8 of them are reported in the Mediterranean Sea. Among those, the ICCAT data base reports catches concerning 14 species in the various areas. These species are often caught as by-catch in surface long-line fisheries targeting tuna and tuna-like species. A number of specimens may also be caught by large driftnet fisheries, even though this fishery is prohibited since years. In some countries there is also a target fishery for some species.

The landings reported to ICCAT are the followings:

Species	code	name	Min catch	Max catch	Latest catch
<i>Carcharhinus plumbeus</i>	CCP	Sandbar shark	<1 t (1990)	468 t (1996)	12 t (2008)
<i>Carcharhinus limbatus</i>	CCL	Blacktip shark	7 t (1990)	565 t (2005)	62 t (2008)
<i>Carcharhinus melapterus</i>	BLR	Blacktip reef shark		<1 t (2007)	<1 t (2007)
<i>Carcharhinus acronotus</i>	CCN	Blacknose shark		49 t (2004)	49 t (2004)
<i>Carcharhinus longimanus</i>	OCS	Oceanic whitetip shark	<1 t (1990)	642 t (2000)	246 t (2008)
<i>Carcharhinus porosus</i>	CCR	Smalltail shark	10 t (2006)	306 (2002)	10 t (2006)
<i>Carcharhinus obscurus</i>	DUS	Dusky shark	<1 t (2003/4)	270 t (1994)	2 t (2008)
<i>Carcharhinus falciformis</i>	FAL	Silky shark	7 t (2006)	531 t (1996)	21 t (2008)
<i>Carcharhinus leucas</i>	CCE	Bull shark	<0 t	375 t (2003)	<1 t (2008)
<i>Carcharhinus brachyurus</i>	BRO	Copper shark	1 t (2001)	7 t (2008)	7 t (2008)
<i>Carcharhinus brevipinna</i>	CCR	Spinner shark	10 t (2006)	306 t (2002)	306 t (2002)
<i>Carcharhinus signatus</i>	CCS	Night shark	< 1 t	1466 t (2002)	41 t (2008)

<i>Carcharhinus isodon</i>	CCO	Finetooth shark		<1 t (2004)	<1 t (2004)
<i>Carcharhinus altimus</i>	RSH	Bignose shark	<1 t (2003)	43 t (2004)	43 t (2004)
Charcharhinidae	RSK	Requiem sharks nei	20 t (2004)	861 t (2008)	861 t (2008)
Carcharhiniformes	CVX		127 t (2006)	2279 t (2003)	234 t (2008)
	PXX	Pelagic sharks nei	15 t (2005)	1011 t (1997)	15 t (2005)

SOURCE OF MANAGEMENT ADVICE: The advisory body for these species is ICCAT for the tuna and tuna-like fisheries, but also the RFMOs concerned by catches obtained by other gears.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: No stock assessment was ever attempted by ICCAT or any other RFMO in the area. IUCN carried out some conservation assessments, including the following species in the Red List:

“Low Concern”: *C. falciformis*;

“Near Threatened”: *C. limbatus*, *C. melanopterus*, *C. obscurus*, *C. leucas*, *C. brevipinna*, *C. plumbeus* (IUCN, in 2007, listed this latter species as “Endangered” for the Mediterranean – see STECF comment);

“Vulnerable”: *C. longimanus*.

RECENT MANAGEMENT ADVICE: None.

STECF COMMENTS: STECF reiterates the comments made during its Plenary 09-02, about the adoption of a different conservation status in the Mediterranean in the absence a discrete and well-defined sub-population.

STECF recommends the collection of basic information on the catches of the different *Carcharhinus* species occurring in the Mediterranean with the aim of better understanding the current state of these species and assessing the possible impacts of the different fisheries.

20.34. Blue stingray (*Pteroplatytrygon violacea*)

FISHERIES: This species is very commonly caught by pelagic gears (long-lines, driftnets) as by-catch and more rarely by trawlers; it is sometimes retained on board and sold in a few markets. Data on catches are usually extremely poorly reported and no catches of this species are included in the ICCAT data bank at the moment. This species often represents the most common Chondrichthyes species in the pelagic longline fishery in the Mediterranean, abundant in some areas and seasons.

SOURCE OF MANAGEMENT ADVICE: The advisory body for these species is ICCAT for the tuna and tuna-like fisheries, but also the RFMOs concerned by catches obtained by other gears.

PRECAUTIONARY REFERENCE POINTS: None.

RECENT MANAGEMENT ADVICE: None by RFMOs. IUCN (2007) classified this species for the Mediterranean as “Near threatened”.

STECF COMMENTS: STECF notes the lack of recent data and recommends a better reporting of the Blue stingray catches from all the fisheries and Member States involved due to the high number of specimens reported in surface fisheries in some geographical areas. STECF recommend that catches of this species must be regularly reported to ICCAT.

21. Highly migratory fish (Indian Ocean)

All the highly migratory species in the Indian Ocean are now managed by the Indian Ocean Tuna Commission (IOTC), an FAO body. This Commission faces a number of difficulties, some of which are related to the number of States taking part in these fisheries. Despite improvements, statistical tables are still not available for all fisheries and particularly for several artisanal fisheries, a very important component for most countries in that area. Many smaller tuna and tuna-like species are not currently examined by the IOTC and data on these species are not available. The situation is slowly improving in the most recent years.

21.1. Pelagic Sharks

FISHERIES: For the Indian Ocean there is currently little quantitative information available on the fisheries targeting or having significant by-catch of pelagic sharks. The following information was taken from: Status of Pelagic Sharks and Rays Report of the IUCN Shark Specialist Group Pelagic Shark Red List Workshop Tubney House, University of Oxford, UK, 19–23 February 2007.

The Indian Ocean borders on the top two shark-fishing nations in the world, Indonesia and India, which together have accounted for 22% of the total FAO-reported chondrichthyan global landings since 2000. Landings of these species have been steadily rising in both the Eastern and Western Indian Ocean since the 1950s, although there has been a slight decline since 2004.

Qualitatively, at least 15 species of sharks are caught in open ocean fisheries in the Indian Ocean, with blue (*Prionace glauca*) and silky (*Carcharhinus falciformis*) sharks probably the most prevalent species, but other species, specifically shortfin mako (*Isurus oxyrinchus*) are also taken in significant number.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: unknown

RECENT MANAGEMENT ADVICE:

Overall, there is a paucity of information available on sharks and this situation is not expected to improve in the short to medium term. There is no quantitative stock assessment or basic fishery indicators currently available for any of the sharks in the Indian Ocean therefore the stock status for all species is highly uncertain. In general, the life history characteristics of sharks; including that they are relatively long lived, typically take (at least) several years to mature, and have relatively few offspring, means that they are vulnerable to overfishing.

Information in the following four sections is taken from the Report of the Thirteenth Session of the IOTC Scientific Committee Bali, Indonesia, 30th March – 3rd April 2009 and from various scientific papers and assessments presented during the IOTC WPs from 2006 - 2008.

[http://www.iotc.org/files/proceedings/2009/s/IOTC-2009-S13-R\[E\].pdf](http://www.iotc.org/files/proceedings/2009/s/IOTC-2009-S13-R[E].pdf)

21.2. Yellowfin tuna (*Thunnus albacares*)

FISHERIES: Recorded catches from this fishery averaged 50,000 tonnes in the years between 1957 and 1983.

From 1984 on, however, the fishery increased sharply, with catches of 111,000 recorded in 1984, 209,000 t in 1989, and almost 400,000 tonnes in 1993. Total annual catches averaged 434,800 t over the period 2003 to 2007. Total catches peaked at 447,700 t in 2003, 511,200 t in 2004 and 490,400 t in 2005 before decreasing to 407,000 t in 2006. Catches in 2007 were 316,700 t and it appears that the catches have returned to pre 2003 levels. Much of this increase can be attributed to the arrival of EU purse seiners in the Indian Ocean.

This stock is exploited mainly by purse seines (about 67% of the catch) and longlines. Artisanal catches, taken by bait boat, gillnet, troll, hand line and other gears have increased steadily since the 1980s. The location of the fishery has changed little since 1990. Yellowfin tuna is fished throughout the Indian Ocean, with the majority of the catches being taken in western equatorial waters.

There are some concerns regarding purse seine fishing using floating FADs, which has led to a rapid increase in the catch of juvenile yellowfin. After an initial decline, mean weights in the whole fishery remained quite stable from the 1970s to the early 1990s. Since 1993, mean weights in the catches in the industrial fisheries have declined. Prior to 2003, although total catch in biomass has been stable for several years, catches in numbers have continued to increase, as there has been more fishing effort directed towards smaller fish. As described above, this situation changed during 2003, 2004 and 2005; where most of the very large catches were obtained from fish of larger sizes. The very recent increases in catches in general has not been as a result of geographic expansion to previously unfished areas, but rather as a result of increased fishing pressure on existing fishing grounds.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: Estimates of current status of the stock in relation to biomass and fishing mortality reference points were sensitive to the value assumed for steepness of the stock-recruitment relationship so the following results are reported with respect to a range of plausible steepness values (0.6 to 0.8).

Estimates of current adult and total biomass are above or just below their respective MSY-based reference points (B_{MSY} and SB_{MSY}), indicating that the stock is close to, or possibly has recently entered, an over-fished state.

Current (2007) fishing mortality estimates were above their respective MSY-based reference points for all but one of the assessments examined, i.e. $F_{CURRENT}/F_{MSY}$ ratios range from 0.9 to 1.60 indicating that overfishing is occurring. This current degree of overfishing is somewhat lower than that estimated occurred during the 2003-2006 period when the F/F_{MSY} ratio ranged from 1.22 to 1.75.

The stock assessments, including independent analyses of the tagging data, indicate that recruitment has declined in recent years.

The estimates of MSY ranged between 250,000 t and 300,000 t based on the integrated assessment that used the tagging data, although other model results expand this range to 360,000 t. The 2007 catch of 317,000 t may have been above the MSY while annual catches over the period 2003-2006 (averaging 464,000 t) were substantially higher than this range of MSY estimates.

RECENT MANAGEMENT ADVICE: At the 13th session of the IOTC in March 2009, Bali the commission provided the following advice on yellowfin tuna. Stock size is close to or has possibly entered an overfished state. Fishing pressure has been too high in recent years, but was somewhat lower in 2007. The catch of yellowfin tuna should not exceed the average catch for the period 1998-2002 (i.e. 330,000 t) and fishing effort should not exceed the level exerted in 2007.

This information was based in the assessment provided by the 10th working party (Oct 2008, Bangkok, which provided the additional management advice:

While the WPTT acknowledges the preliminary nature of the yellowfin tuna assessment in 2008, all results indicate that fishing mortality should not return to the high levels observed in recent years (2003-2006).

Given the extraordinarily high catches in 2003-2006, it is likely that overfishing was occurring over that period; however, it is not clear if the stock is currently overfished or whether a return to a level of fishing pressure equivalent to that existing just prior to 2003 will lead to the stock being overfished.

The WPTT considers that the status of the stock of yellowfin is not going to change markedly over the next year and recommends that fishing pressure be closely monitored and assessments be undertaken annually for the next several years. However, the WPTT forewarns, that if the results of the 2008 assessment are confirmed in 2009, then changes to the current fishery in terms of catches and/or effort will likely be recommended.

STECF COMMENTS: STECF agrees with the advice from IOTC and stresses the importance of avoiding any further increase of fishing effort and catches above the 1998-2002 level and based on previous advice underlines the need to reduce the catches of juveniles.

21.3. Bigeye tuna (*Thunnus obesus*)

FISHERIES: Bigeye tuna is predominantly caught by industrial (long line and purse seine) and occasionally by artisanal fisheries. Longline fisheries started to target bigeye in the 1970s and mainly catch adults >80 cm. There was a rapid development of the purse seine fisheries during the 1990s in association with drifting and floating FADs. These fleets mainly catch small fish <80 cm. The location of the fishery has changed little since 1990. Bigeye tuna is fished throughout the Indian Ocean, with the majority of the catch being taken in western equatorial waters.

Reported total catches in the Indian Ocean of bigeye tuna peaked during 1997-99 at 144-150,000 t per year. Total annual catches averaged 121,700 t over the period 2003 to 2007. The 2006 catch was 112,100 t and the provisional 2007 catch stands at 117,900 t.

Over 75% of purse seine bigeye catches are taken in log-schools along with skipjack and yellowfin tuna. Catches increased since the beginning of the fishery, peaked at over 30,000 t from 1997 to 1999 and then stabilized at around 20,000 t.

Much of the bigeye catches from the purse seine fleets are juveniles (under 10 kg), and this results in purse seiners taking a larger numbers of individual fish than longliners. Large bigeye tuna (above 30 kg) are primarily caught by longlines, and in particular deep longliners.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The 9th IOTC WP on tropical tunas performed a new assessment of this stock in 2006 using 5 models: SS2, ASPM, ASPIC, SP Bayes-Baynesian Pella-Thompson and CASAL. From the resulting range of MSY estimates, a value of 111,200 t (estimated by ASPM) was reported ahead of the estimates from the other methods. Given that the mean annual catch for the period 2002-2006 was 121,800 t and the catch estimate for 2006 is 105,700 t, it appears that the stock is being exploited at around its maximum level. Furthermore, the spawning stock biomass appeared (in 2006) to be above the level that would produce MSY while the fishing mortality in 2004 was below the MSY level. Conversely biomass trajectories indicate that the spawning stock biomass has been declining since the late 1970's while fishing mortality has been increasing steadily since the 1980's

In addition the outlook would revert to a more pessimistic one if, as expected, the exploitation pattern reverted to a pre-2003 one. In this context, by 2005 the fishery was already showing a return to a pre-2003 exploitation pattern with increased catches of bigeye tuna associated with floating objects.

It should be noted that these results are all impaired by a lack of catch-at-size data for various fisheries and various uncertainties: recruitment (which has been assumed independent of the spawning stock biomass), growth, conversion factors and changes in catchability.

Maximum Sustainable Yield:	111,200 t (95,000 – 128,000)
Preliminary catch in 2006 (<i>data as of October 2007</i>)	105,700 t
Catch in 2005	114,600 t
Mean catch over the last 5 years (2002-2006)	121,800 t
Current Replacement Yield	-
Relative Biomass (SSB_{2004}/SSB_{MSY})	1.34 (1.04 – 1.64)
Relative Fishing Mortality (F_{2004}/F_{MSY})	0.81 (0.54 – 1.08)

The recent evaluation of the 10th IOTC WP which preformed a preliminary analysis of tagging information provided no new advice, but stated that the initial analyses of tagging data indicate that the probability of B2007 being greater than BMSY was high (i.e. an 86 % chance) and exploitation rates for ages 0-2 years appear to be below MSY levels.

RECENT MANAGEMENT ADVICE: The stock size and fishing pressure in 2004 were within acceptable limits. Catch rates have gradually declined since 1980. In 2008, preliminary assessment results based on tagging data suggest a high probability that the stock is not in an overfished state. Catches should not exceed the MSY and fishing effort should not increase further from the 2004 levels.

STECF COMMENTS: STECF agrees with IOTC advice and stresses the importance of keeping the total catch and effort under strict control, as well as reducing catches of juveniles.

21.4. Skipjack (*Katsuwonus pelamis*)

FISHERIES: Catches of skipjack increased slowly from the 1950s, reaching around 50,000 t at the end of the 1970s, mainly due to the activities of baitboats (or pole and line) and gillnets. Catches increased rapidly with the arrival of the purse seiners in the early 1980s, and skipjack became one of the most important tuna species in the Indian Ocean. The annual total catches exceeded 400,000 t in the late 1990's and the average annual catch for the period from 2002 to 2006 was 514,100 t (catches in 2006 may have been the highest reported in the history of the fishery 596,200 t). The trend in catches is, in particular, due to an expansion of the FAD-associated fishery. Nor is there any sign that the rate of increase is diminishing in recent years: catches in 2004 were

464,500 t rising to 529,600 t in 2005 and 612,200 t in 2006, but dropping to 447,100 t in 2007 mainly due to lower catches in the purseine fleet.

In recent years, the proportions of the catch taken by the industrial purse seine fishery and the various artisanal fisheries (baitboat, gillnets and others) have been fairly consistent, the majority of the catch originating from the western Indian Ocean. IOTC estimates that 30 to 40 % of the total catch of skipjack is taken in gillnet fisheries (mainly from Sri Lanka, Iran, Pakistan, India and Indonesia).

The increase of skipjack catches by purse seiners is due in large part to the development of a fishery in association with Fish Aggregating Devices (FADs). Currently, 80 % of the skipjack tuna caught by purse-seine is taken under FADs. In addition catch rates by purse seiners show an increasing trend in two of the three main fishing areas possibly due to an increase in fishing power and to an increase in the number of FADs (and the technology associated with them) in the fishery.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC.

PRECAUTIONARY REFERENCE POINTS: None

STOCK STATUS: While no quantitative stock assessment is currently available for skipjack tuna in the Indian Ocean, the range of stock indicators available does not currently signal any problems in the fishery. For example, IOTC has noted that catches have continued to increase as effort increased. Furthermore, the majority of the catch comes from fish that are sexually mature (greater than 40 cm) and therefore likely to have already reproduced. Conversely IOTC also notes that, although there might be no reason for immediate concern, it is clear that the catches cannot be increased at the current rate indefinitely. Therefore, it has recommends that skipjack be monitored regularly.

RECENT MANAGEMENT ADVICE:

Skipjack is a highly productive species. Catches have increased with increasing fishing pressure with no symptoms for concern in the status indicators. Stock size and fishing pressure are considered to be within acceptable limits. There is no need for immediate concern.

STECF COMMENTS: STECF accepts that while there are currently no warring indications coming from the assessment of this stock, it is clear that the catches cannot be increased at the current rate indefinitely. Therefore, it agrees with the IOTC advice that skipjack be monitored appropriately and regularly. In addition it shares the concerns expressed by IOTC regarding the effect of the extensive and growing 'FAD' fisheries on juveniles of other tuna species. These should be strictly monitored and evaluated.

21.5. Swordfish (*Xiphias gladius*)

FISHERIES: Swordfish in the Indian Ocean is caught mainly using drifting longlines (95%) and gillnets (5%). Swordfish was mainly a bycatch of industrial longline fisheries before the early 1990's. Catches increased gradually from 1950 to 1990 as the catches of targeted species (such as tropical and temperate tunas) increased. Catches increased markedly after 1990 to peaks of around 35,000 tonnes in 1998 and 36,000 tonnes in 2003 and 2004. The current catch of swordfish is around 30,000 tonnes. The increase in catch is attributed to a change in target species from tunas to swordfish by part of the Taiwanese fleet, the development of longline fisheries in Australia, La Reunion, Seychelles and Mauritius targeting swordfish, and the arrival of longline fleets from the Atlantic Ocean (Portugal, Spain and other fleets operating under various flags) also targeting swordfish. The largest catches are obtained in the southwestern Indian Ocean. By-catches and discards (mainly sharks and billfish) are important in these fisheries. While the data for this stock are improving with time, major gaps remain particularly gaps in the time series, under-reporting of discards, lack of size-frequency data as well as problems with aggregation and misidentification.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IOTC

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: In 2009 the 7th IOTC WP on Billfish in the Seychelles carried out assessments on swordfish using a number of models (SS3, ASPIC, ASIA, ASPM). The WP was unable to decide on a single model on which to base it advice. The combined results suggest that MSY could reasonably be in the range of ~28-34,000 tonnes, though this is the lower end of the range for some models and the upper end of the range for others.

Similarly, all approaches (except ASPM) suggest that depletion could be in the range of $B_{2007}/B_0 = 0.4 - 0.5$, though again this may be an upper or lower end of the plausible range depending on the model. Comparison across models suggest that current catches are probably near MSY (and F is probably near FMSY), but could be somewhat above or below.

Given the general recent declining trend in all the CPUE series, and the fully exploited status of the stock, the WPB expects that abundance will likely decline further at current effort levels, especially considering that the issue of increases in efficiency has not been fully addressed in the current standardization. When combined with the uncertainty in the assessment, the WPB considers that there is a reasonably high probability that common target and limit reference points (eg. BMSY, $0.4B_0$) may be marginally exceeded, and this probability will increase over time if effort remains at current levels or increases further. There does not seem to be a strong conservation-based justification for highly disruptive management action at this time, but precautionary measures such as capacity control or catch limits will reduce the risk of creating an overcapacity problem or increasing the risk of exceeding common biomass limit reference points.

The apparent fidelity of swordfish to particular areas is a matter for concern as this can lead to localised depletion. The CPUE of the Japanese fleet in the south west IO has the strongest decline of the four areas examined in 2009; furthermore, the La Reunion CPUE series shows a declining trend in this area over the last 10 years. In previous years, localised depletion was inferred on the basis of decreasing CPUEs following fine-scale analyses of the catch and effort data. Therefore the WPB cannot discount the possibility that localised depletion is still occurring in some areas. Localised depletion has occurred in other parts of the world where swordfish have been heavily targeted.

RECENT MANAGEMENT ADVICE:

The 13th session of the IOTC advised that the overall stock size and fishing pressure are within acceptable limits on the basis of the 6th IOTC WP report. However, there have been some localised declines possibly related to high fishing pressure in some areas (e.g. in the southwest Indian Ocean area). Catches should not increase above the 2006 levels and fishing effort should not increase from the 2007 levels. Furthermore, management measures focused on controlling and/or reducing effort, especially in the south-west Indian Ocean are recommended.

STECF COMMENTS: STECF agrees with the advice from IOTC. STECF notes that the most recent advice was issued on the basis of the assessment carried out in 2008, with new advice likely to be given during the IOTC session in December 2009. The information above relating to stock status is from the 2009 assessment.

22. Highly Migratory fish (Northeastern, eastern, southern and western-central Pacific)

As a general remark, the management of highly migratory species in the Pacific Ocean remains very unclear. The Inter-American Tropical Tuna Commission (IATTC), an FAO body, has managed stocks in the Eastern Pacific Ocean for many years; the Western Central Pacific Fishery Commission (WCPFC) manages stocks in the Western and Central Pacific Ocean; the Southern Pacific Communities (SPC) also plays a role managing some stocks in the Southern Pacific Ocean while, more recently, the International Scientific Committee for Tuna and Tuna-like species in the North Pacific Ocean (ISC) provides management advice for the migratory tuna and tuna-like species in the Northern Pacific Ocean. Other smaller bodies also play a role. These Commissions faces a number of difficulties, some of which are related to the number of States taking part in these fisheries and the huge marine area concerned. Despite improvements, statistical tables are still not available for all fisheries and particularly for several artisanal fisheries, a very important component for most countries in that area. Importantly, data reported to FAO Fishstat differ (sometimes significantly) from those reported to the various Commissions; these discrepancies should be addressed as a matter of priority.

Thus, the management of several stocks remains uncertain and/or undefined, without specific boundaries, sometimes with several overlapping competencies and, in some cases, with conflicting data published by different management bodies for the same stock. Many smaller tuna and tuna-like species are not currently monitored or assessed by these Commissions and data on those species are not available.

22.1. Pacific Bluefin tuna (*Thunnus orientalis*)

FISHERIES: It is assumed that there is one single stock of Pacific bluefin that spawn in waters between the Philippines and Japan before migrating more than 11,100 kilometres to the Eastern Pacific, only to return to their birth waters to spawn again. Tagging studies have shown that there is exchange of Pacific bluefin between the eastern and western Pacific Ocean. Larval, postlarval, and early juvenile bluefin have been caught in the WPO, but not the EPO, so it is likely that there is a single stock of bluefin in the Pacific Ocean.

Most bluefin catches in the eastern Pacific Ocean are taken by purse seiners from May through October. Bluefin caught in the western Pacific are exploited by various gears at different times of the year: trolling from July to October of younger fish about 15-30 cm in length; trolling from November to April of younger fish about 35-60 cm in length; purse seining of older fish from May to September; and other gears (traps, gillnets, pole-and-line, longlining) throughout the year. Pacific bluefin tuna is primarily exploited by Japanese, Korean, Taiwanese, Mexican and US fleets. EU vessels have never exploited this stock.

The total catch has fluctuated between 8,500 t in 1990 and 38,000 t in 1956. Recent catches are relatively higher, and the average for the past five years was 22,300 t. During the same period, Japan's catch accounted for 40–60% of the total catch, followed by Mexico and Korea. Catches by some nations have increased recently, for example by Mexico in its Baja fishery for farming. This fishery takes a wide variety of fish sizes, including relatively small fish, which is a concern with respect to stock status (WCPC 2007).

The total catch between 1976 and 2005 ranged from 31,376 t to 6,721 t in the WPO and from 32,482 t to 8,376 t in the EPO. Catches in the WPO have varied in recent years and in 2008 amounted to 20,403 t. In the WPO Japanese longliners take the major part of the reported catches (83,5% in 2007).

In the EPO the estimated catches for 2008 were 4,501 t, showing a strong decrease (>50%) from 2006. Almost all of the catches in EPO are taken by purse seines (4,245 t, in 2007 by Mexico alone), but data from the longline fishery are missing in 2007.

SOURCE OF MANAGEMENT ADVICE:

Bluefin tuna in the north Pacific is co-operatively managed by two regional fisheries management organizations: the 16-member Inter-American Tropical Tuna Commission (IATTC) and the 26-member Western and Central Pacific Fisheries Commission (WCPFC). Note: Southern bluefin tuna, which frequent both the Pacific and Indian Oceans, is managed by the five-member Commission for the Conservation of Southern Bluefin Tuna (CCSBT). The Scientific Committee of the Western and Central Pacific Fisheries Commission has performed a comprehensive assessment of this stock in 2009.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The most recent stock assessment of Pacific bluefin tuna was conducted in 2008 by the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific. It noted that while the spawning biomass is currently at historically median levels at 20,000 t, the recruitment of young fish (age 0) is highly variable, catch weight is dominated by young fish and juveniles (ages 0 to 3), and current fishing mortality is greater than the reference points that are generally used by scientists as potential target for fishing mortality. The Committee also assessed the effects of environmental changes on these tuna. Based on their observations and uncertainties, the Committee advised that current levels of fishing could continue if environmental conditions remained the same, but they also noted that if fishing effect was reduced, it could, over time, lead to higher yields. Finally, the Committee cautioned that increases in current fishing levels or any unfavourable changes in environmental conditions might reduce recruitment and noted that this would be cause for concern.

RECENT MANAGEMENT ADVICE: Noting the uncertainty in the assessments, the International Scientific Committee has provided the following conservation advice:

- If F remains at the current level and environmental conditions remain favourable, the recruitment should be sufficient to maintain current yield well into the future.
- A reduction in F in combination with favourable environmental conditions, should lead to greater SPR.
- Increases in F above the current level, and/or unfavourable changes in environmental conditions, may result in recruitment levels which are insufficient to sustain the current productivity of the stock.

- Given the conclusions of the May-June 2008 stock assessment with regard to the current level of F relative to potential target and limit reference points, and residual uncertainties associated with key model parameters, it is important that the current level of F is not increased.
- Given the conclusions of the July 2009 PBFWG, the current level of F relative to potential biological reference points, and increasing trend of juvenile F, it is important that the current [sic] level of F is decreased below the 2002-2004 levels on juvenile age classes.

STECF COMMENTS:

STECF stresses the need to have a clear management responsibility for this species attributed to a single Fishery Commission or to a Joint Expert Group, to avoid the possibility of competency conflicts and contradictory advice.

22.2. Eastern Pacific Yellowfin (*Thunnus albacares*)

FISHERIES: Yellowfin are distributed across the Pacific Ocean, but the bulk of the catch is made in the eastern and western regions. The purse-seine catches of yellowfin are relatively low in the vicinity of the western boundary of the EPO. The movements of tagged yellowfin are generally over hundreds, rather than thousands, of kilometers, and exchange between the eastern and western Pacific Ocean appears to be limited. This is consistent with the fact that longline catch-per-unit-of-effort (CPUE) trends differ among areas. It is likely that there is a continuous stock throughout the Pacific Ocean, with exchange of individuals at a local level, although there is some genetic evidence for local isolation. Movement rates between the EPO and the western Pacific cannot be estimated with currently-available tagging data.

The average annual catch in the EPO during the period 1991-2006 varied from 174,000 to 443,000 t (average 271,000). Catches in 2002 were the highest on record (443,000 t), while those in 2004, 2005 and 2006 decreased substantially with the catch in 2007 (about 173,413 t) the lowest since 1984. Preliminary catch data for 2008 (to August 31) is 144,449 t. The average weights of the yellowfin caught in 2006 were significantly lower than those of the previous five years

SOURCE OF MANAGEMENT ADVICE: The advisory body is IATTC.

PRECAUTIONARY REFERENCE POINTS: None: the use of a spawning stock - biomass ratio (SBR) proposed.

STOCK STATUS: The most recent stock assessment⁷ of yellowfin tuna (*Thunnus albacares*) in the eastern Pacific Ocean (EPO) was undertaken using an integrated statistical age-structured stock assessment model (Stock Synthesis Version 3; Methot, 2005, 2009) based on the assumption that there is a single stock of yellowfin in the EPO. This model differs from that used in previous assessments.

It appears that the yellowfin population has experienced two, or possibly three, different recruitment regimes (1975-'82, 1983-2001, and possibly 2002-'06) corresponding to low, high, and intermediate recruitment.

The spawning biomass ratio (SBR: ratio of spawning biomass to that of the unfished stock) was below the level corresponding to the average maximum sustainable yield (A_{MSY}) during the lower productivity regime, but above that level during the following years, except for the most recent period 2004-2007. The 1984 increase in the SBR is attributed to a regime change, while the recent decrease may be a reversion to an intermediate recruitment regime.

The two different productivity regimes may support two different MSY levels and associated SBR levels. The SBR at the start of 2009 is estimated to be above the level corresponding to the MSY. The effort levels are estimated to be less than those that would support the MSY (based on the current distribution of effort among the different fisheries), but recent catches are substantially below MSY.

The MSY calculations indicate that, theoretically, at least, catches could be increased if the fishing effort were directed toward longlines and purse-seine sets on yellowfin associated with dolphins. This would also increase the SBR levels.

⁷ <http://www.iattc.org/PDFFiles2/SARM-10-06a-YFT-assessment-2008.pdf>

The MSY has been stable during the assessment period, which suggests that the overall pattern of selectivity has not varied a great deal through time. However, the overall level of fishing effort has varied with respect to the level corresponding to MSY.⁸

If a stock-recruitment relationship is assumed, the outlook is more pessimistic, and current biomass is estimated to be below the level corresponding to the MSY. The status of the stock is also sensitive to the value of adult natural mortality, the method used to model selectivity, and the assumed length of the largest age.

RECENT MANAGEMENT ADVICE: Significant levels of fishing mortality have been estimated for the yellowfin fishery in the EPO. These levels are highest for middle-aged yellowfin. Despite more catch being taken in schools associated with dolphins than the other fisheries, the floating object and purse seine sets on unassociated schools have a greater impact on the yellowfin spawning biomass.

Under current levels of fishing mortality (2006-2008), the spawning biomass is predicted to slightly decrease, but remain above the level corresponding to MSY. However, the confidence intervals are wide, and there is a moderate probability that the SBR will be substantially above or below this level. It is predicted that the catches will be higher over the near term than in 2008, but will decline slightly in the future. Fishing at F_{msy} is predicted to reduce the spawning biomass slightly from that under current effort and produces slightly higher catches.

In 2009, IATTC, whilst noting that catches of yellowfin tunas have decreased, also consider that capacity continues to increase in this fishery; that the yellowfin tuna resource in the EPO supports one of the most important surface fisheries for tunas in the world; and that tuna studies indicate that the spawning stock will likely decline under current levels of fishing mortality;.

In June 2009 IATTC adopted RESOLUTION⁹ C-09-01: on a multiannual program for the conservation of tuna in the eastern pacific ocean in 2009-2011. This resolution provides a number of general measures applicable in the years 2009-2011 to all purse-seine vessels of IATTC capacity classes 4 to 6 (more than 182 metric tons carrying capacity), and to all longline vessels over 24 meters length overall, that fish for yellowfin (and bigeye and skipjack) tunas in the EPO. Specific measures in respect of yellowfin tuna include

- All purse-seine vessels covered by the resolution must stop fishing in the EPO for a period of 59 days in 2009, 62 days in 2010, and 73 days in 2011.
- The fishery for yellowfin tuna by purse-seine vessels within the area of 96° and 110°W and between 4°N and 3°S be closed from 0000 hours on 29 September to 2400 hours on 29 October, 2009-2011.

STECF COMMENTS: STECF agrees with the advice from IATTC.

22.3. Western and Central Pacific Yellowfin (*Thunnus albacares*)

FISHERIES: The development of this fishery is recent in comparison to many other tuna fisheries. Purse seiners harvest about 53% of the total catch, while longline and pole-and-line fleets comprise 16% and 3% respectively.

In the WCPO catches reached 353,000 t in 1990, peaked at 462,000 t in 1998 and remained high through 2003; the low catch rates observed during 2002 in the purse-seine fishery are considered unusual for an *El Nino* event. Catches dropped to 362,431 t in 2004, increased again in 2005 to 435,876 t and fell to 399,828 t in 2006. Data from 2007 preliminarily suggests landings of 431,814 t. The most likely cause of lesser catches is a decline in recruitment.

The European purse-seine fleet has been operating in the WCPO since 1999, albeit with sporadic catches. This fleet consists of five large purse-seiners with 100% onboard observer coverage (Agreement on the International Dolphin Conservation Program - AIDCP).

The Spanish surface longline fleet started fishing in WCPFC waters in 2004. In 2007 Spain reported a total retained catch of 4,019 t and 5.3 t of discards¹⁰.

⁸ Note: the SBR corresponding to MSY decreased substantially from the previous assessment indicating that the results are sensitive to the change in methodology. The change is attributed to the method used to model selectivity. However, the SBR relative to SBR-MSY (i.e. relative to the SBR corresponding to MSY) and the F multiplier are similar to the previous assessment.

⁹ <http://www.iattc.org/PDFFiles2/C-09-01-Tuna-conservation-2009-2011.pdf>

¹⁰ Discards for the Spanish catches are reported for all areas together; then, discards in the WCPO were calculated on a proportional base.

SOURCE OF MANAGEMENT ADVICE: While there is no specific management body for this species, WCPFC does provide management advice, supported by the Oceanic Fishery Programme (South Pacific Community) and the International Science Committee. The primary assessment tool used to assess the stock is MULTIFAN-CL. The Stock Assessment - Scientific Working Group (SA-SWG) of the South Pacific Community (SPC) revised all available data in 2007. No stock assessment was conducted in 2008.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: The 2007 stock assessment conclusions differ slightly from the 2006 assessment, particularly in relation to the ratio of the current estimate of fishing mortality compared with the fishing mortality at maximum sustainable yield (F/F_{MSY}), with the threshold in the 2007 assessment being slightly more optimistic than that in the 2006 assessment.

While the point estimate of F/F_{MSY} remains slightly less than 1.0 (0.95), the probability distribution associated with the fishing mortality-based reference point indicates that there is almost an equal probability that the value of F/F_{MSY} is less than or greater than the reference point. Therefore, the possibility of overfishing is still relatively high (47%).

The reference points that predict the status of the stock under equilibrium conditions are B/B_{MSY} (1.10) and SB/SB_{MSY} (1.12), which indicate that the long-term average biomass would remain slightly above the level capable of producing MSY at 2002–2005 average fishing mortality.

Overall, current biomass exceeds the estimated biomass at MSY ($B/B_{MSY} > 1.0$) indicating that the yellowfin stock in the WCPO is not in an overfished state, although there is a small probability (6.2%) that it is in an overfished state.

The change in the estimated MSY in 2007 from that in 2006 may reflect changes in the data structure, fishery designations and levels of uncertainty in the assessment, especially in estimating absolute values, and the change in the scenarios modelled between years.

RECENT MANAGEMENT ADVICE: The Scientific Committee of the Commission for the Conservation and Management of Highly Migratory Fish Stocks in the Western and Central Pacific Ocean noted that since no stock assessment was conducted in 2008, new management advice was not provided. The Committee went on to note that previous management advice (from SC3 to the Commission) was that the WCPO yellowfin tuna fishery can be considered to be fully exploited, with both the 2006 and 2007 assessments indicating a high probability that overfishing is occurring. In order to reduce the likelihood of overfishing or the manager's wishes to maintain average biomass at levels greater than 5% above B_{MSY} , reductions in the rate of fishing mortality would be required.

STECF COMMENTS: STECF supports the management advice of WCPFC. STECF underlines the need to have a clear management responsibility for this species attributed to a single Fishery Commission or to a Joint Expert Group, to avoid the existing overlapping of advice arising from at least two separate stock assessments covering the areas for the separate Commissions involved.

22.4. Pacific Bigeye (*Thunnus obesus*)

FISHERIES: Bigeye are distributed across the Pacific Ocean, but the bulk of the catch is made to the east and to the west of the mid-Pacific. The purse-seine catches of bigeye are substantially lower close to the western boundary (150°W) of the EPO; the longline catches less sporadic, but at lower levels between 160°W and 180°.

Bigeye are not often caught by purse seiners in the EPO north of 10°N, but a substantial portion of the longline catches of bigeye in the EPO is made north of that parallel. Bigeye tuna do not move long distances (95% of tagged bigeye showed net movements of less than 1000 nautical miles), and current information indicates little exchange between the eastern and western Pacific Ocean. This is consistent with the fact that longline catch-per-unit-of-effort (CPUE) trends differ among areas. It is likely that there is a continuous stock throughout the Pacific Ocean, with exchange of individuals at local levels. Currently, there are not enough tagging data to provide adequate estimates of movement between the eastern and western Pacific Ocean.

There have been substantial changes in the bigeye tuna fishery in the eastern Pacific Ocean (EPO) over the last 15 years. Initially, the majority of the bigeye catch was taken by longline vessels, but with the expansion of the

fishery on fish associated with fish aggregating devices (FADs) since 1993, the purse-seine fishery has taken an increasing proportion of the bigeye catch.

Overall, the catches in both the EPO and WCPO have increased, but with considerable fluctuation. The catches in the EPO reached 105,000 t in 1986, and have fluctuated between about 73,000 and 148,000 t since then, with the greatest catch in 2000.

In the WCPO the catches of bigeye increased to more than 77,000 t during the late 1970s, decreased during the 1980s, and then increased, with lesser fluctuations, until 1999, when the catches reached more than 115,000 t. Catches of bigeye in the WCPO increased significantly in 2004 to 146,000 t. In 2005 and 2006 the catches of bigeye in the WCPO were 132,000 and 114,000 t, respectively.

Prior to 1994, the average annual retained catch of bigeye taken by purse-seine vessels in the EPO was about 8,000 t (range 1,000 to 22,000 t). Following the development of FADs, the annual retained purse-seine catches increased from 35,000 t in 1994 to between 44,000 and 95,000 t during 1995-2000.

A preliminary estimate of the retained catch in the EPO in 2007 is 61,000 t. The average amount of bigeye discarded at sea during 1993-2006 was about 5% of the purse-seine catch of the species (range: 2 to 12%).

Small amounts of bigeye have been caught in some years by pole-and-line vessels. During 1978-1993, prior to the increased use of FADs and the resulting greater catches of bigeye by purse-seine vessels, the longline catches of bigeye in the EPO ranged from 46,000 to 104,000 t (average: 74 thousand t) about 89%, on average, of the retained catches of this species from the EPO. During 1994-2006 the annual retained catches of bigeye by the longline fisheries ranged from about 35 to 74 thousand t (average: 53 thousand t), an average of 45% of the total catch of bigeye in the EPO. The preliminary estimate of the longline catch in the EPO in 2007 is 26 thousand t.

SOURCE OF MANAGEMENT ADVICE: While there is no specific advisory body for this species, various bodies (IATTC, WCPTC, ISC and SPC) conduct assessments. The Stock Assessment - Scientific Working Group (SA-SWG) of the South Pacific Community (SPC) revised all available data in 2005 and carried out a new stock assessment. IATTC also conducted an assessment in 2009.

PRECAUTIONARY REFERENCE POINTS: Maintaining tuna stocks at levels that produce the MSY is the management objective specified by the IATTC Convention; however IATTC has not adopted any target or limit reference points for this stock.

STOCK STATUS: The most recent stock assessment¹¹ of bigeye tuna (*Thunnus obesus*) in the eastern Pacific Ocean (EPO) was undertaken using an integrated statistical age-structured stock assessment model (Stock Synthesis Version 3; Methot 2005, 2009.).

At the beginning of January 2008, the spawning biomass of bigeye tuna in the EPO was near the historic low level. At that time the SBR was about 0.17, about 11% less than the level corresponding to the MSY. Recent catches are estimated to have been 19% higher than MSY levels. If fishing mortality is proportional to fishing effort, and the current patterns of age-specific selectivity are maintained, the level of fishing effort corresponding to the MSY is about 81% of the current (2006-2008) level of effort. The MSY of bigeye in the EPO could be maximized if the age-specific selectivity pattern were similar to that for the longline fishery that operates south of 15N because it catches larger individuals. Before the expansion of the floating-object (FAD) fishery that began in 1993, the selectivity was such that MSY was greater than the current MSY and the fishing mortality was less than F_{MSY} .

All analyses indicate that, at the beginning of 2009, the spawning biomass was probably below SB_{MSY} . The MSY and the F multiplier are sensitive to model choice, but under all scenarios considered, fishing mortality is well above F_{MSY} .

Recent spikes in recruitment are predicted to result in stabilized levels of SBR and increased longline catches for the next few years. However, current levels of fishing mortality would subsequently reduce the SBR. Under current effort levels, the population is unlikely to remain at levels that support MSY unless fishing mortality levels are greatly reduced or recruitment is above average for several consecutive years.

These simulations are based on the assumption that selectivity and catchability patterns will not change in the future. Changes in targeting practices or increasing catchability of bigeye as abundance declines (*e.g.* density-dependent catchability) could result in differences from the outcomes predicted here.

¹¹ <http://www.iattc.org/PDFFiles2/SARM-10-06b-BET-assessment-2008.pdf>

RECENT MANAGEMENT ADVICE: In 2009, IATTC, whilst noting that catches of bigeye tunas have decreased, also consider that capacity continues to increase and that the stock is below a level that would produce the maximum sustainable yield (MSY).

In June 2009 IATTC adopted RESOLUTION¹² C-09-01: on a multiannual program for the conservation of tuna in the eastern pacific ocean in 2009-2011. This resolution provides a number of general measures applicable in the years 2009-2011 to all purse-seine vessels of IATTC capacity classes 4 to 6 (more than 182 metric tons carrying capacity), and to all longline vessels over 24 meters length overall, that fish for yellowfin, bigeye and skipjack tunas in the EPO. Specific measures in respect of bigeye tuna include

- All purse-seine vessels covered by the resolution must stop fishing in the EPO for a period of 59 days in 2009, 62 days in 2010, and 73 days in 2011.
- The fishery for bigeye tuna by purse-seine vessels within the area of 96° and 110°W and between 4°N and 3°S be closed from 0000 hours on 29 September to 2400 hours on 29 October, 2009-2011.
- CPC's to take the measures necessary to control the total annual catch of bigeye tuna in the EPO during 2009-2011 by longline tuna vessels fishing under its jurisdiction.
- China, Japan, Korea, and Chinese Taipei to take the measures necessary to ensure that their total annual longline catches of bigeye tuna in the EPO during 2009-2011 do not exceed set levels.
- Other CPCs to take the measures necessary to ensure that their total annual longline catches of bigeye tuna in the EPO during 2009-2010 do not exceed the greater of 500 metric tons or their respective catches of bigeye tuna in 2001.

STECF COMMENTS: STECF agrees with the advice from IATTC.

22.5. Eastern Pacific Skipjack (*Katsuwonus pelamis*)

FISHERIES: Catches of Eastern Pacific Skipjack have varied between 52,000 and 311,000 t over the time series. Between 1988 and 2006 the annual retained catch from the EPO averaged 168,914 t however fishing zones have also shown a great variability during the same period. Part of this variability is due to the fact that yellowfin is often preferred to skipjack in the area.

The preliminary estimate of the total catch of skipjack in 2007 is 220,665 t (including discards of 8,896 t), 29% lower than the 2006 catch. Preliminary 2008 catch data (to August 31) indicate a dramatic increase of 58% to 218,175 t over the same period in 2007. Skipjack is primarily caught by purse seiners (99,5% of total skipjack catches in the EPO) from Ecuadorian, Mexican, Panamanian and Venezuelan fleets along with the EU and other South American countries. Spain reported 699 t of retained catches from the WCPO in 2007 along with 8 t of discards¹³.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IATTC.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: This stock has been assessed in 2001, 2002, 2004, 2006 and 2008, but these assessments are still considered preliminary. The results of the 2008 assessment look more reasonable, possibly due to the improvement of data. One main point is that skipjack recruitment is highly variable in this area and induces fluctuations in the biomass, so that it is difficult to estimate the status of this stock (with the model used: A-SCALA).

New data have been included in 2008 trials, showing that strong cohorts entered the fishery in 2002-2003, increasing both the biomass and the catches in 2003. The results of the analysis in 2006, in which an index of relative abundance was developed from the ratio of skipjack to bigeye tuna in the floating object fishery, were consistent with previous assessments, and suggest that there is no management concern for skipjack tuna, apart from the associated catch of bigeye in floating-object sets. However, the results are still very uncertain.

In 2008, trend and yield-per-recruit analyses were performed and showed that the fishing effort reached the highest level since 1991, while the average weight showed a level near to the lowest point, after a continuous decreasing trend since 2000, suggesting high exploration rates. A simple population model fitted to the CPUE

¹² <http://www.iatc.org/PDFFiles2/C-09-01-Tuna-conservation-2009-2011.pdf>

¹³ Discards for the Spanish catches are reported for all areas together; then, discards in the EPO were calculated on a proportional base.

and catch data showed that this inconsistency could be explained by increases in both exploitation rates and abundance. Alternatively it is possible that the vulnerability of skipjack to purse seine fishing is increasing.

The most recent information on this stock, posted in May 2009, concerns updated indicators of stock status. This report notes that Skipjack tuna is a notoriously difficult species to assess. Due to skipjack's high and variable productivity (*i.e.* annual recruitment is a large proportion of total biomass), it is difficult to detect the effect of fishing on the population with standard fisheries data and stock assessment methods. This is particularly true for the stock of the EPO, due to the lack of age-frequency data and the limited tagging data. The continuous recruitment and rapid growth of skipjack mean that the temporal stratification needed to observe modes in length-frequency data make the current sample sizes inadequate. Previous assessments have had difficulty in estimating the absolute levels of biomass and exploitation rates, due to the possibility of a dome-shaped selectivity curve (Maunder 2002; Maunder and Harley 2005), which would mean that there is a cryptic biomass of large skipjack that cannot be estimated. The most recent assessment of skipjack in the EPO (Maunder and Harley 2005) is considered preliminary because it is not known whether the catch per day fished for purse-seine fisheries is proportional to abundance. The results from that assessment are more consistent among sensitivity analyses than the earlier assessment, which suggests that they may be more reliable. However, in addition to the problems listed above, the levels of age-specific natural mortality are uncertain, if not unknown, and current yield-per-recruit (YPR) calculations indicate that the YPR would be maximized by catching the youngest skipjack in the model (Maunder and Harley 2005). Therefore, neither the biomass- nor fishing mortality-based reference points, nor the indicators to which they are compared, are available for skipjack in the EPO.

This report goes on to note that the main concern with the skipjack stock is the constantly increasing exploitation rate. However, the data- and model-based indicators have yet to detect any adverse consequence of this increase. The average weight is near its lower reference level, which can be a consequence of overexploitation, but it can also be caused by recent recruitments being greater than past recruitments.

RECENT MANAGEMENT ADVICE: IATTC has given no management advice.

STECF COMMENTS: STECF notes that the level of catches, together with the increased fishing effort and decreasing average weight are reasons for concern about the high level of exploitation of this stock. More detailed analyses are necessary to inform future management measures.

22.6. Western and central Pacific skipjack (*Katsuwonus pelamis*)

FISHERIES: Catches of western and central Pacific skipjack tuna increased steadily from 1970, and more than doubled during the 1980s. The yields were relatively stable during the 1990s and ranged from 870,000 to 1,300,000 tonnes. A Japanese pole-and-line fleet previously dominated the fishery; however this has now been superseded by purse seiners. Over the past 5 years the catch has been at record high levels (exceeding 1.2 Million t annually) and accounting for more than 65% of the total annual catch of principal tuna species landed from the region.

In 2006, an estimated catch of 1,538,112 t of skipjack was reported, while a total of 1,726,702 t were reported in 2007 (the highest recorded catch from this stock). About 85% of the 2007 catch was taken by purse seiners, 10% by pole and line, 4% by other gear types and 1% by longlines. The geographic distribution of fishing activities shows some recent changes.

Spain in 2007 reported 12,688 t of retained catches and about 151 t of discards¹⁴ in the WCPO.

SOURCE OF MANAGEMENT ADVICE: The WCPFC is the management body, supported by the Oceanic Fishery Programme of the Secretariat of the Pacific Community (SPC). A stock assessment was performed in 2008 (using also MULTIFAN-CL). The Stock Assessment - Scientific Working Group (SA-SWG) of the South Pacific Community (SPC) had revised all the available data.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The 2008 assessment was conducted at two spatial scales: the entire WCPO stratified into six regions and a model restricted to the two regions encompassing the equatorial WCPO. Despite this the major

¹⁴ Discards for the Spanish catches are reported for all areas together; then, discards in the WCPO were calculated on a proportional base.

conclusions are essentially unchanged from the last three assessments indicating a strong increase in the purse seine catchability, while the catchability of pole-and-line fleet has decreased.

Recruitment to the stock has been high since the mid-1980s and recent recruitment is estimated to be exceptionally high: this appears to be related to the higher frequency of *El Niño* events

Biomass also increased from the mid-1980s in response to recruitment, and current biomass is well above the biomass that would produce MSY.

Based on the current assessments MSY is estimated to be about 1,280,000 t in and, overall, the results suggest that current exploitation is modest relative to the biological potential of the stock. Continued catches at the 1,200,000 t level are sustainable but only if there is continued high levels of recruitment. These are believed to be determined principally by environmental factors rather than a strong spawner-recruit relationship.

In conclusion, stock size and fishery performance are firstly driven by recruitment variability, which is influenced by environmental conditions (El Niño). The key conclusion of the models presented is that overfishing is not occurring and the stock is far from the overfished state, confirming the results of the previous assessment. According to the 2008 assessment, there is a near zero possibility that $B_{current}/B_{MSY}$ is anywhere close to 1.

RECENT MANAGEMENT ADVICE: Any increase in purse seine catches of skipjack may results in a corresponding increase in fishing mortality for yellowfin and bigeye tuna. WCPFC, in 2005, had decided some management measures, including a limitation of the fishing efforts by purse-seiners and longliners to either the 2004 or average 2001-2004 levels; a control of FAD sets; and observers on board on vessels operating between 20°N and 20°S

STECF COMMENTS: Although the outlook of this stock seems positive, STECF is concerned by the very high level of catch in recent years and the difficulties in monitoring the various fleets concerned. Due to the very high relevance of this stock in terms of fishery, economy, proteins and social benefits and, at the same time, its role in marine ecosystem, a very high level of removals over many years might result in major undesired and unpredictable changes in various sectors, including the pelagic ecosystem.

STECF notes that setting a TAC for this stock is difficult as a large part of the catch is driven by recruitment. which is difficult to predict.

22.7. Northern Pacific Albacore (*Thunnus alalunga*)

FISHERIES: This stock is fished by longliners (from Taiwan, Japan and USA) and by surface fleets (USA). EU vessels have never reported fishing on this stock. Total catches of albacore from the North Pacific peaked in the early 1970s at over 100,000 t per year, and then declined. Catches recovered during the 1990s and reached a peak of 127,376 t in 1999. Preliminary catch estimates in EPO in 2007 were 90,551 t, a value 44.8% higher than the catch in 2006 in the same area. Preliminary catch estimates of the northern Pacific albacore in the WCPO in 2007 are about 35,795 t.

SOURCE OF MANAGEMENT ADVICE: While there is no well-defined advisory body for this species, both the US National Marine Fisheries Service (NMFS) and IATTC monitor this stock. The most recent North Pacific albacore stock assessment was conducted in 2006 using ISC, and provided conservation advice. The 2006 stock assessment was conducted with the VPA-2BOX model while experimental trials with the Stock Synthesis II (SS2) model were conducted at the 2008 ISC NPAWG meetings. This latter model will be used in the next assessment planned for 2010.

PRECAUTIONARY REFERENCE POINTS: None.

STOCK STATUS: No new assessment of this stock was undertaken. According to the most recent, 2006, assessment, spawning stock biomass shows fluctuations around the modelled time series average (1966–2006) of 100,000 t. The 2006 stock assessment indicated that SSB increased from 73,500 t in 2002 to 153,300 t in 2006 and is projected to increase further to 165,800 t in 2007. The increase is attributable to strong year-classes in 2001 and 2003.

Total catch in 2006 (63,601t) was slightly greater than in 2005 and catch increased substantially to 91,644 t in 2007. The 2007 catch is typical of the catches occurring during the 1996-2004 period. Preliminary catch for 2008 (66,138 t) decreased substantially, returning to a level more typical of the years after 2004.

The estimated spawning stock size in 2006 of 153,300 t is approximately 53% above the overall time series average (1966–2005). Projections (2007–2020), using an average productivity of 27.75 million fish and F equal to 0.75, indicate that the SSB will reach equilibrium by 2015 at 92,600 t (90% CI=62,700–129,300). The population is being fished at roughly $F_{17\%}$ (i.e., $F_{2002-2004} = 0.75$): this result is similar to the 2004 assessment however F_{current} (0.75) is high relative to commonly used F reference points.

The stock status revision trials in 2008 indicate increases both in catches and CPUE compared to 2005 values. Results of the updated projections (using 2006 and 2007 catch) indicated the SSB estimates in the near future are greater than those estimated in the 2006 stock assessment. This difference is primarily due to the actual catch (in 2007) being less than that assumed in the projection work done in 2006. $F_{\text{SSB-Min}}$ estimates also became higher due to the larger SSB estimate in the near future.

RECENT MANAGEMENT ADVICE: The most recent assessment of North Pacific albacore was conducted at a workshop of the Albacore Working Group of the International Scientific Committee for Tuna and Tuna-like Species in the North Pacific Ocean (ISC), held in November-December 2006. The conclusions reached at this workshop include the following:

- The spawning stock biomass (SSB) in 2006 was estimated to be about 153 thousand t–53% above the long-term average
- Retrospective analysis revealed a tendency to overestimate the abundance of albacore;
- Recruitment had fluctuated about a long-term average of roughly 28 million fish during the 1990s and early 2000s;
- The current coefficient of fishing mortality (F) is about 0.75, which is high relative to several biological reference points to which Working Group compared its estimate for albacore;
- The SSB is forecast to decline to an equilibrium level of about 92 thousand t by 2015;
- The substantial decline in total catch during recent years is cause for concern;

STECF COMMENTS: STECF notes that fishing mortality has markedly increased in recent years. STECF underlines the need to have a clear management responsibility for this species attributed to a single Fishery Commission or to a Joint Expert Group, to avoid the possible overlapping of competences and advice.

STECF notes that the assumption of the 2007 catches in the catch projections undertaken in 2006 differs significantly for the realized catches in 2007. This brings into question the precision of the catch estimates as there is a risk that the stock size is overestimated in 2008 and subsequent years possibly leading to over optimistic catch estimates in the projections.

22.8. Southern Pacific albacore (*Thunnus alalunga*)

FISHERIES: The development of this fishery is relatively recent in comparison to many other tuna fisheries. Catches from Pacific Island countries have increased in recent years and accounted for 50% of the total longline catches in 2002.

After an initial period of small-scale fisheries development, annual catches of South Pacific albacore varied considerably and have recently been between about 60,000–70,000 t. The longline fishery harvested most of the catch, about 25,000–30,000 t per year on average, prior to about 1998. The increase in longline catch to approximately 70,000 t in 2005 is largely due to the development of small-scale longline fisheries in Pacific Island countries. Catches from the troll fishery are relatively small, generally less than 10,000 t per year. The driftnet catch reached 22,000 t in 1989, but has since declined to zero following a United Nations moratorium on industrial-scale drift-netting.

Total catch in 2004 was about 55,000 t - less than the peak of 62,000 t obtained in 2002. Since the driftnet fishery ceased in 1991, most catches came from New Zealand and USA troll fleets south of 30°S and by longline fleets that operated in waters 10°–50° S. The catches reported by WCP in 2005 amounted to 58,188 t. Catches in 2006 in WCPO were about 58,000 t, but they are not clearly reported in the assessment. Total catches for 2007 reached 59,495 t (>75% obtained by longlines).

Note: The boundary of this stock was recently moved from 30°S to 25°S.

SOURCE OF MANAGEMENT ADVICE: While there is no specific advisory body for this species, Scientific Committee of the Western and Central Pacific Fisheries Commission has performed a comprehensive assessment of this stock in 2009.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The 2009 assessment concluded that levels of stock size and MSY appear more realistic than in the 2008 assessment, because many sources of potential bias have been removed. However, uncertainty remains over a moderate range of biomass and fishing mortality levels. Models that down-weight the length frequency data (in order to rely on the index of abundance from the CPUE data), tend to give lower biomass relative to B_{MSY} , and higher fishing mortality relative to F_{MSY} , throughout the time series. There is considerable uncertainty about the early biomass trend, but this has negligible effect on the management parameters. Estimates of $F_{2005-2007}/F_{MSY}$ (from 0.1 to 0.5) and $SB_{2005-2007}/SB_{MSY}$ (from 1.7 to 4.9) are quite variable between model configurations, but the variation does not include overfishing, above F_{MSY} , or an overfished state below SB_{MSY} .

Most of the longline albacore catch is taken in a relatively narrow latitudinal band (10–40° S). The highest catch rates for albacore in the subequatorial area are relatively localised and limited to discrete seasonal periods, possibly associated with the northern and/or southern movements of fish during winter and/or summer. These peaks in seasonal catch rates tend to persist for a couple of months and to extend over a 10° latitudinal range. On this basis, it would appear that the main component of the longline exploitable biomass resides in a relatively small area, suggesting a modest stock size.

The results of the 2009 assessment suggest that regional stock depletion has contributed to catch rate declines, but localised depletion may also have contributed. Observed declines in catch rates from significant domestic longline fisheries (e.g. Fiji, French Polynesia, and Samoa) — following periods of relatively high albacore catch (3,000–10,000 t per year) — may indicate localised stock depletion (Langley 2004). Strong relationships may occur between catch rates and removals in the preceding 10 day period (Langley 2006). It is possible that movement rates into and out of EEZ's are lower than peak catch levels, and there is some viscosity (perhaps residency) in the population.

RECENT MANAGEMENT ADVICE: At a local scale, very high levels of fishing effort appear to be capable of causing localised depletion of albacore tuna. This is principally an issue for domestic longline fleets where fishing effort is concentrated in a relatively small area, largely due to operational constraints of the fleet. Indications from the Fijian, Samoan and French Polynesian longline fishery is that, on average, catch rates may be reduced by about 20% at high levels of fishing effort.

The model estimates that, in theory, increasing effort to F_{MSY} would yield somewhat more catch in the long term (equilibrium yield at current effort 63,000 mt; MSY 97,000 mt). However, higher yields at the current exploitation pattern of the fishery would require more fishing effort, resulting in lower adult biomass and lower longline catch rates. Thus, any consideration of management objectives and performance indicators for the South Pacific albacore fishery needs to also consider the economics of those longline fisheries targeting albacore in the region.

WCPFC, in 2005, adopted management measures, including a limitation on the number of fishing vessels to the current or recent historical (2000-2004) levels.

STECF COMMENTS: STECF notes that, again, the latest assessment indicates that increasing effort in areas of albacore concentration can result in a sudden drop in catch rate ('Strong relationships may occur between catch rates and removals in the preceding 10 day period). STECF therefore advises that catch rates and fishing effort should be closely monitored.

22.9. Black skipjack (*Euthynnus alletteratus*)

FISHERIES: Total catch in the EPO ranged from about 107 to 4,250 t, with the peak in 1993. Preliminary catch estimate for 2007 accounts for about 3,538 t, about 6% less than the previous year, confirming a slight decline since 2005. Almost all the catches (99%) are taken by purse-seiners (2,067 t retained and 1,434 t discarded). Data from other Pacific Ocean areas are not available.

SOURCE OF MANAGEMENT ADVICE: It is unclear which management body is responsible for the management of this species in the Pacific Ocean (IATTC provides management advice for the EPO).

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No data.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF notes that data on this species should also be collected by the WCPFC.

22.10. Pacific bonito (*Sarda spp.*)

FISHERIES: This genus in the Pacific includes three species (*Sarda australis*, *S. chilensis* and *S. orientalis*), having different distributions and fisheries. Available fishery data however, probably only relate to two of these species and then only for a partial range of their distribution. Historical catch in the EPO ranged from about 26 to 14,227 t, with a previous peak in 1990. Total preliminary catch in 2007 was about 17,610 t, a new historical peak and about 5 times higher than the previous year. The 2007 catches are also 5 times higher than the average catch (3,622 t) in the last 20 years (1987-2006). Almost all the catches (about 93%) are provided by purse-seiners (15,680 t retained and 687 t discarded), however IATTC have noted that this species is also caught by artisanal fisheries and these catches are not reported. Preliminary 2008 catch estimates for the period to August 31 shows a strong reduction (-86%) compared to the same period in 2007.

SOURCE OF MANAGEMENT ADVICE: It is unclear which management body is taking care of this species in the Pacific Ocean, but IATTC is providing the management for the EPO.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: no data.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF notes the need for robust fishery data to support the provision of management advice for bonito in the Pacific and there is a need to collect data on catches from the WCPO and from artisanal fisheries throughout the whole Pacific. There is also a need to investigate and explain the reasons behind the recently observed peak catches reported from the Pacific. STECF considers that the limited distribution of some species of bonito together with the growing demand for bonito for high quality canned products may require that the fishery for bonito in the Pacific is closely monitored.

22.11. Pacific swordfish (*Xiphias gladius*)

FISHERIES: Swordfish occur throughout the Pacific Ocean between about 50°N and 50°S. They are caught mostly by the longline fisheries of Far East and Western Hemisphere nations. Lesser amounts are taken by gillnet and harpoon fisheries. They are seldom caught by recreational fishermen. During the most recent three-year period the greatest catches in the eastern Pacific Ocean (EPO) have been taken by vessels of Spain, Chile, and Japan, which together harvest about 70% of the total swordfish catch taken in the region. All three have fisheries that target swordfish, though most of the swordfish taken in the Japanese fishery are incidental catches of a fishery that targets predominantly bigeye tuna. Other nations with fisheries known to target swordfish are Mexico and the United States.

Swordfish tend to inhabit waters further below the surface during the day than at night, and they tend to inhabit frontal zones. Several of these occur in the EPO, including areas off California and Baja California, off Ecuador, Peru, and Chile, and in the equatorial Pacific. Swordfish tolerate temperatures of about 5° to 27°C, but their optimum range is about 18° to 22°C. Swordfish larvae have been found only at temperatures exceeding 24°C. The best available scientific information from genetic and fishery data indicate that the swordfish of the northeastern Pacific Ocean and the southeastern Pacific Ocean (south of 5°S) constitute two distinct stocks. Also, there may be movement of a northwestern Pacific stock of swordfish into the EPO at various times. During the most recent three-year period the greatest catches in the EPO have been taken by vessels of Spain, Chile, and Japan, which together harvested about 72% of the total swordfish catch taken in the region. Of these

three, Spain and Chile have fisheries that target swordfish, while swordfish taken in the Japanese fishery are incidental catches in a fishery that predominately targets bigeye tuna.

The average annual catch during 1998-2002 for the northern region has been about 4,800 t, and for the southern region about 9,100 t. Catches in the southern region have doubled during this period, reaching 13,300 t in 2002, which exceeded the previously-recorded high catch of 12,400 t reported in 1991. The average annual longline catch of swordfish during 1990-2004 was 10,000 t, but during 2001-2004 was about 16,000 t. It is not clear if this is due solely to increasing effort directed toward swordfish. Total swordfish catches in the EPO reached 19,726 t in 2002, decreasing to 18,520 t in 2003, 15,687 t in 2004, 13,290 t in 2005 and 12,712 t in 2006 of which 8,812 t were taken by longlines, 3,985 t by other gear while 5 t was discarded. Preliminary and largely incomplete catch reports in 2007 amount to only 601 t. It is to be noted that Spain alone reported to IATTC swordfish catches of 5,152 t in 2007 and these are clearly not included in the IATTC reported catch in the EPO. Total swordfish catch in WPO were 19,431 t in 2000, then dropping to 12,707 t in 2004 and 1,965 t in 2005 (provisional and incomplete by data). It is to be noted that Spain alone reported to WCPFC swordfish catches of 3,107 t in 2007 for the WPO. Catches in the SW and SC Pacific show a peak in 2003 at about 7,500 t, decreasing to about 7,100 t in 2004, 5,800 t in 2005, 6,200 t in 2006 and 6,100 t in 2007. Catches in various Pacific areas are reported only in number of fish.

SOURCE OF MANAGEMENT ADVICE: the advisory bodies are IATTC, ISC, WCPFC and SPC, without a clear distinction of competencies.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The ISC's 2009 stock assessment of swordfish in the North Pacific Ocean was based on two different stock structure hypotheses: a single homogeneous stock in the North Pacific Ocean and two stocks (WCPO and EPO) in the North Pacific Ocean with little or no mixing between them, the latter of which is the preferred hypothesis because most of the stock structure evidence so far supports this hypothesis.

Results using the single stock hypothesis indicate that the MSY is 19,100 t and the exploitable biomass has been well above this MSY level. The estimated harvest rate has been well below the harvest rate of 34% at MSY. The harvest rate for 2006 was 13%.

With the two-stock hypothesis, the results for the WCPO stock indicate that the MSY is 14,400 t and the exploitable biomass has largely been above this MSY level for the entire time series of data. The estimated harvest rate at MSY is 26% and actual harvest rates have largely been below this level for the entire time series. In 2006, the harvest rate was 14%. Projecting this harvesting rate to 2010, results in the exploitable biomass continuing to remain above the biomass at MSY.

The ISC concluded that both stocks of swordfish in the North Pacific Ocean are healthy and well above levels required to sustain recent catches.

RECENT MANAGEMENT ADVICE: IATTC has not provided any management recommendations.

STECF COMMENTS: STECF is concerned that the growing international markets for swordfish may result in an increase in targeted fishing effort on swordfish in the Pacific. STECF advises that fisheries exploiting for swordfish in the Pacific should be closely monitored and all attempts to undertake more comprehensive assessments should be encouraged by the various Commissions concerned.

22.12. Pacific Blue Marlin (*Makaira nigricans*)

FISHERY: The best knowledge currently available indicates that blue marlin constitutes a single world-wide species, and that there is a single stock of blue marlin in the Pacific Ocean. For this reason, statistics on catches are compiled, and analyses of stock status are made, for the entire Pacific Ocean. Blue marlin are taken mostly by longline vessels of many nations that fish for tunas and billfishes between about 50°N and 50°S. Lesser amounts are taken by recreational fisheries and by various other commercial fisheries. Small numbers of blue marlin have been tagged, mostly by recreational fishermen, with conventional tags. A few of these fish have been recaptured long distances from the locations of release. In addition, blue marlin has been tagged with electronic tags and their activities monitored for short periods of time. Blue marlin usually inhabit regions where the sea-surface temperatures (SSTs) are greater than 24°C, and they spend about 90% of their time at depths in which the temperatures are within 1° to 2° of the SSTs.

Blue marlin are taken by longline vessels of many nations that fish for tunas and billfishes between about 50°N and 50°S. Lesser amounts are taken by recreational and sport fisheries and by various commercial surface fisheries. The fisheries in the EPO have historically captured about 10 to 18% of the total harvest of blue marlin from the Pacific Ocean (42,000 t in 2002), with captures in the most recent 5-year period averaging about 10% of the total harvest. The reported total catch in the EPO were 3,937 t in 2004, about 3,676 t in 2005 and 2,093 t in 2006. The preliminary catch estimate in 2007 is only about 136 t. Spain reported catches of 16.7 t in the WCP and 1.1 t in EPO in 2007.

SOURCE OF MANAGEMENT ADVICE: The advisory body is IATTC, but WCPFC and ISC also share competence.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: A production model was used to assess the status of the blue marlin stock of the Pacific Ocean. Data for the estimated annual total retained catches for 1951-1997 and standardized catches per unit of effort developed from catch and nominal fishing effort data for the Japanese longline fishery for 1955-1997 were used. It was concluded that the levels of biomass and fishing effort were near those corresponding to the maximum sustainable yield (MSY). A more recent analysis of data for the same years, but using MULTIFAN-CL, was conducted to assess the status of blue marlin in the Pacific Ocean and to evaluate the efficacy of habitat-based standardization of longline effort. There is considerable uncertainty regarding the levels of fishing effort that would produce the MSY. However, it was determined that blue marlin in the Pacific Ocean are close to fully exploited, i.e. that the population is near the top of the yield curve. It was also found that standardization of effort, using a habitat-based model, allowed estimation of parameters within reasonable bounds and with narrower confidence intervals about the estimates. A new assessment is planned in 2010.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF notes that quantities of billfish caught in the Pacific Oceans are still not reported by species. In addition, and many catches that are known to occur are not reported at all. The lack of reliable catch data is affecting the understanding of this stock and the management advice.

22.13. Pacific Striped Marlin (*Tetrapturus audax*)

FISHERY: Striped marlin occurs throughout the Pacific Ocean between about 45°N and 45°S. They are caught mostly by the longline fisheries of Far East and Western Hemisphere nations. Lesser amounts are caught by recreational, gillnet, and other fisheries. Catches in the WPO showed an increasing trend up to 1970, then a decreasing trend in recent years. Catches in WPO were 5,998 t in 2000, while incomplete reported catches dropped to 2,225 t in 2004 and 492 t in 2005; more recent catches are not available. Spain reported 0.27 t of striped marlin caught in the WCPO in 2007.

During recent years the greatest catches in the eastern Pacific Ocean (EPO) have been taken by fisheries of Costa Rica, Japan, and the Republic of Korea. Landings of striped marlin decreased in the EPO from 1990-1991 through 1998, and this decline has continued, with an average annual catch during 2000 to 2005 of about 1750 t (ranging between about 1,645 and 2,235 tons). There ported catches in the EPO in 2005 amount to 1,645 t and about 1,589 t in 2006 among the lowest historical catches in this area. The preliminary catch estimate for 2007 is only 140 t.

The principal recreational fisheries for striped marlin in the EPO operate within about 50 to 100 miles of the shores of Mexico. These are generally characterized as catch-and-release for all marlin species. Sport-fishing trips increasing from about 32,500 trips in the early 1990s to about 55,500 trips in recent years, with annual catches of striped marlin increasing from about 13,300 fish to about 30,000 fish over this period. A record high catch of about 58,000 individuals was taken in 2007, the most recent year for which complete data are available, and the preliminary estimate for 2008 is of the same magnitude.

Average release rate for the 1999-2007 period was about 77.4 percent (range: 72.4 to 82.5). Assuming 100 percent mortality of fish released, and the reported annual median weight of fish sampled, then the conservative estimate of average annual mortality resulting from the recreational fishery during 1990-2006 was about 195 t (range: 115 to 310), and the mortality associated with the record high catch in 2007 was about 545 t. At a mortality rate of about 25 percent (Domeier et al., 2003), the mortality in 2007 was about 140 t.

SOURCE OF MANAGEMENT ADVICE: Traditionally, the advisory body was IATTC, but currently both ISC and the WCPFC also deal with this species.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The stock structure of striped marlin in the Pacific Ocean is not well known. Analyses of stock status made using two production models, taking into account the time period when billfish were targeted by longline fishing in the EPO, were considered the most plausible. A Pella-Tomlinson model yielded estimates of the average maximum sustained yield (A_{MSY}) in the range of 3,700 to 4,100 t, with a current biomass to be about 47% of the unfished biomass. The current biomass is estimated to be greater than the biomass that would produce the A_{MSY} . An analysis, using the Deriso-Schnute delay-difference model, yielded estimates of A_{MSY} in the range of 8,700 to 9,200 t, with current biomass greater than that needed to produce the A_{MSY} and about 70% of the size of the unexploited biomass.

The stock(s) of striped marlin in the EPO are apparently in good condition, with current and near-term anticipated fishing effort less than that required to produce the A_{MSY} . The most recent analysis carried out by ISC indicates that the spawning biomass in the North Pacific in 2003 was estimated to be only 14-15% of the 1970 levels. The results of these assessments are considered provisional. According to WCPFC, several of the plausible model scenarios investigated indicate that current levels of fishing mortality may approximate or exceed the reference level F_{MSY} and current spawning biomass levels may approximate or be below the biomass based reference point B_{MSY} . A new assessment is planned in late 2008.

The information and results presented indicate that striped marlin population levels in the EPO are at or above the level expected to provide landings at MSY levels, which are currently estimated at about 3,300 to 3,800 t, substantially more than the current catch. There has been an observed decreasing trend in standardized fishing effort since about 1990-1991, and nominal fishing effort and catch have continued to decline since about 2001. There are indications that for the next few years the nominal fishing effort will continue near or below levels observed in recent years. Based on the information, analyses and hypotheses discussed and shown herein, it is considered that the striped marlin stocks in the EPO are in good condition, with current and near-term anticipated fishing effort less than F_{MSY} .

RECENT MANAGEMENT ADVICE: No management advice has been provided by IATTC (who believe that this stock is probably at or above the average MSY level). On the contrary, ISC has recommended that fishing mortality for striped marlin in the north Pacific should not be permitted to exceed current levels. The same measure was recommended by the Scientific Committee of the WCPFC for the area covered by that Commission. The WCPFC in 2008 decided that, for management purposes and with the goal to adopt the necessary conservation measures, the North Pacific striped marlin should be considered in the future as a separate stock and ISC should take care of its assessment. ISC adopted a conservation advice to reduce the fishing mortality from the current levels.

STECF COMMENTS: STECF notes that the advice arising from the IATTC and the WCPFC is based on incomplete data and provisional assessment results. STECF notes that quantities of billfish caught in the Pacific Ocean are still not reported by species and many catches known to occur are not reported at all. The lack of reliable catch data is affecting the understanding of this stock and the management advice.

22.14. Pacific Black Marlin (*Makaira indica*)

FISHERY: The Pacific Black Marlin is a by-catch mostly from the long-line fishery, but is a target species in some artisanal and recreational fisheries. Catches reached a peak of about 905 tons in 1973, decreasing in the following years. Total catch in the EPO from 1976 to 2006 ranged between 112 t to 621 t; the average catch in the period from 2000 to 2006 was about 185 t. The total catch in the EPO for 2006 is 177 t; a value about 26% higher than the 2005 catch. Preliminary catch estimates for 2007 reports about 91 t. EU-Spain in 2007 reported catches of 2.8 t in the WCPO and 0.2 t in the EPO.

SOURCE OF MANAGEMENT ADVICE: Traditionally, the advisory body was IATTC, but WCPFC, ISC and SPC are also competent.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No recent stock assessments have been made for this species, although there are some data presented in the IATTC Bulletin series published jointly by scientists of the National Research Institute of Far Seas Fisheries (NRIFS) of Japan and the IATTC that show trends in catches, effort, and CPUEs.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF notes that quantities of billfish caught in the Pacific Ocean are still not reported by species and many catches known to occur are not reported at all. The lack of reliable catch data is affecting the understanding of this stock and the management advice.

22.15. Pacific Shortbill Spearfish (*Tetrapturus angustirostris*)

FISHERY: The information in sections 11.15-11.17 was updated using resources available on the internet as provided by the advisory bodies relevant to these stocks. Since the most recent information that could be found on assessment of stock status and management advice was relating to 2007, it would appear that no new information is may not be available.

The shortbill spearfish is occasionally taken as a by-catch in various fisheries or is as a target species in some artisanal or recreational fisheries. Reported catches in the EPO have increased were growing since 1994, reaching a peak of 304 tons in 2001. Recent catches are below this peak showing alternate values (274 t in 2002, 293 t in 2003, 208 t in 2004, 278 t in 2005 and 263 in 2006). The preliminary catch estimate in 2007 is only 2 tons. EU-Spain in 2007 reported very low catches, 0.1 t in the WCPO and <0.01 t in the EPO. No estimate for 2008 landings exists. Data from 2008 could not be found for Pacific shortbill spearfish in the EPO.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are IATTC, WCPFC, ISC and SPC..

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: There are no recent No recent stock assessments available for appear to have been made for this species, although there are some data presented in the IATTC Bulletin series published jointly by scientists of the National Research Institute of Far Seas Fisheries (NRIFS) of Japan and the IATTC showing that show trends in catches, effort, and CPUEs.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF notes that quantities of billfish caught in the Pacific Ocean are still not reported by species and many catches known to occur are not reported at all. The lack of reliable catch data is affecting the understanding of this stock and the management advice.

22.16. Indo-Pacific Sailfish (*Istiophorus platypterus*)

FISHERY: Indo-Pacific sailfish is not uncommon among longline catches in the Pacific Ocean. Reported catches fluctuate considerably, reaching a peak of 2,323 tons in 1993. Between 1997 and 2002 catches in the EPO ranged from 1,241 to 1,848 tons. Recent catches are showing alternate values (1,270 t in 2003, 1,453 t in 2004, 860 t in 2005 and 769 t in 2006). The preliminary catch estimate in 2007 is 173 t.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are IATTC, WCPFC, ISC and SPC.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: No recent stock assessments have been carried out made for this species, although there are some data presented in the IATTC Bulletin series published jointly by scientists of the National Research Institute of Far Seas Fisheries (NRIFS) of Japan and the IATTC that show trends in catches, effort, and CPUEs.

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF notes that quantities of billfish and sailfish caught in the Pacific Ocean are still not reported by species and many catches known to occur are not reported at all. The lack of reliable catch data is affecting the understanding of stock status and the management advice.

22.17. Indo-Pacific Marlins, Sailfish, Spearfish and Billfish (mixed species)

FISHERY: Billfish, marlins and sailfish species in the Indo-Pacific are very often reported together by the various Regional Fishery Commissions concerned, without a clear distinction among species, due to the poor statistics available. Reported catches in the EPO were growing up to a peak of 2,491 t in 2002, while recent catches are showing decreasing values (1,398 t in 2003, 1,393 t in 2004, 906 t in 2005 and 506 t in 2006). Preliminary catch estimates in 2007 are only 60 t. All billfish catches combined in the WCPAC are reported to be about 4,713 t in 2004, with an average of 5,816 t in the period 1998-2001. Spain in 2007 reported 0.5 t in the WCPO and 0.02 t in the EPO. Although information relating to landings, stock assessment or advice for 2008 could not be found for these species in the EPO, some information from the Indian Ocean was available from the IOTC Working Party on Billfish 2009 report. This stated that the 2008 catch information from the La Reunion fishery operating in the Indian Ocean was incomplete because of unreturned logbooks. Catches were comprised of 3% marlin, 1% sailfish, 1% spearfish. No significant changes had happened in the fleet since 2007 and the number of vessels operating had remained the same.

SOURCE OF MANAGEMENT ADVICE: The advisory bodies are IATTC, WCPAC, SPC, ISC and IOTC.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for these stocks.

STOCK STATUS: Not available

RECENT MANAGEMENT ADVICE: No management advice.

STECF COMMENTS: STECF remarks that these quantities of billfish, marlins, spearfish and sailfish caught in the Pacific Ocean are still not reported by species and many catches known to occur are not reported at all. The lack of reliable catch data is affecting the understanding of stock status and the management advice.

22.18. Pacific jack mackerel (*Trachurus symmetricus*)

FISHERY: The Pacific jack mackerel, *Trachurus symmetricus* (also known as the Californian jack mackerel or simply jack mackerel), is an abundant species of pelagic marine fish in the jack family, Carangidae. The species is distributed along the western coast of North America, ranging from Alaska in the north to the Gulf of California in the south, inhabiting both offshore and inshore environments. The Pacific jack mackerel is a moderately large fish, growing to a maximum recorded length of 81 cm, although commonly seen below 55 cm. It is very similar in appearance to other members of its genus, *Trachurus*, especially *Trachurus murphyi*, which was once thought to be a subspecies of *T. symmetricus*, and inhabits waters further south. Pacific jack mackerel travel in large schools, ranging up to 600 miles offshore and to depths of 400 m, generally moving through the upper part of the water column. Chilean (also known as Peruvian) jack mackerel (*Trachurus symmetricus murphyi*) is widespread throughout the South Pacific, from the shelf adjacent to Ecuador, Peru, and Chile; throughout the oceanic waters along the Subtropical Convergence Zone; in the New Zealand EEZ south of about 34S; and, in south-eastern waters of the Australian EEZ. From genetic studies it has been identified as a distinct species and supports one of the largest single-species fisheries in the world, with annual landings approaching 2.5 million tonnes (FAO, 2004). The fish aggregate in dense schools and layers, exhibit daily vertical migration, and feed on zooplankton associated with the upwelling areas off central-south Chile.

All species can be caught by bottom trawl, midwater trawl, or by purse seine targeting surface schools. Reported catches of Chilean jack mackerel (for FAO area 87) were 1.28 million tonnes in 1980, grew year-on-year to reach a peak of 4.96 million tonnes in 1995 and decreased thereafter to 1.5 million tonnes in 2000. Since then catches have averaged 1.7 million tonnes.

SOURCE OF MANAGEMENT ADVICE: The advisory body for the Chilean jack mackerel is the South Pacific Regional Fisheries Management Organisation.

PRECAUTIONARY REFERENCE POINTS: The South Pacific Regional Fisheries Management Organisation¹⁵ has determined that, for the Chilean stock in 2005, a fishing mortality reference point of $F_{40\%BDR}$, F/F_{ref} was 1.25. No precautionary reference points have been proposed for the other stocks.

¹⁵ SPRFMO-III-SWG-16

STOCK STATUS:

The Chilean straddling stock is, at present, considered to be fully exploited. Given the moderate productivity of this species, caution with respect to any increases in fishing mortality is needed. For the other stocks, given the absence of current information, is not possible to provide detailed comment. However, given the moderate productivity of this species and the lack of information about current stock biomass levels, due caution is appropriate.

RECENT MANAGEMENT ADVICE: No management advice.

In 2007, the South Pacific Regional Fisheries Management Organisation noted that with the exception of Chilean vessels, there are no management measures in place for jack mackerel fisheries in the high seas (New Zealand and Australian vessels that may take this species as an occasional by-catch are regulated by a high seas permitting regime).

Due to the nature of the straddling Chilean stock, the same regulatory controls that apply within the Chilean EEZ also apply on the high seas: these controls include maximum catch limits per vessel owner and size limits.

STECF COMMENTS: STECF agrees with the advice provided by SPRFO.

23. Resources in the Antarctic

Resources in the Antarctic are managed under a convention administered by the Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR). CCAMLR member countries participated in 13 fisheries in the Convention Area during the 2008/09 season¹⁶. Up to 25 September 2009, reported total catches of targeted species were 123 948 tonnes of krill (*Euphausia superba*), 13 025 tonnes of toothfish (*Dissostichus* spp.) and 1 936 tonnes of icefish (*Champscephalus gunnari*). This review of Antarctic resources is based on the document SC-CAMLR-XXVIII (28th Report of the Scientific Committee 2009; www.ccamlr.org, publications) and CCAMLR-XXVIII (Draft report of the 28th meeting of the Commission. 26th October 2009-6th November 2009).

23.1. Toothfish (*Dissostichus* spp.)

The total catch of toothfish in the CCAMLR Convention Area during the 2007/08 season (up to the end of September 2009) was 13 025¹⁷ t, compared to 15,592t for the whole of the 2007/08 season. Catches outside the Convention Area were 10 065 t up to the end of September 2009, compared with 12,682 t for the whole of the 2007/08 season. The estimated IUU catch for all subareas and divisions in the Convention Area was 938 tonnes. This was a reduction from 1,169t in 2007/08 and 3,615 t in 2006/07. With the exception of exploratory fisheries, toothfish are exploited under the conservation measures in two main areas: in the Atlantic Ocean Sector (Subareas 48.3 and 48.4), and the Indian Ocean Sector (Subareas 58.6 and 58.7 and Divisions 58.5.1 and 58.5.2).

23.1.1. Patagonian toothfish (*Dissostichus eleginoides*) in Subarea 48.3, South Georgia

FISHERIES: Longline fishing for *Dissostichus eleginoides* began in the early 1990s. Annual catches are in generally in the range 3,000 to 5,000 t. There was significant illegal fishing in the mid to late 1990s, exceeding the catch of the legal fishery in some years. There has been no significant IUU catch since the 2000/01 season. The total catch in the Subarea 48.3 in 2008/09 was 3,383 t.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the CCAMLR. The assessment is based on an integrated assessment (CASAL) that uses catch at length, CPUE and tagging data. CASAL model structure and assumptions are detailed in the WG-FSA Report (2009). Assessments are now carried out biennially. The assessment in 2009 was used to set catch limits for two years; 2009/10 and 2010/11. The assessment will be updated at the 2011 meeting of WG-FSA.

¹⁶ The CCAMLR fishing season runs from 1 December to 30 November.

¹⁷ Provisional figure subject to update at the end of the fishing season.

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+35\text{years}} \geq 50\% SSB_0$; probability of SSB dropping below 20% of $SSB_0 < 0.1$

STOCK STATUS: The stock in Sub area 48.3 is considered fully exploited. $SSB_{\text{current}} > 50\% SSB_0$

RECENT MANAGEMENT ADVICE: Long-term annual yield of 3,000 t.

STECF COMMENTS: STECF has no comments.

23.1.2. Patagonian toothfish (*Dissostichus eleginoides*) in Subarea 48.4, South Sandwich Islands

FISHERIES: Licensed longline vessels commenced fishing for *D. eleginoides* in Subarea 48.4 in 1991/92 and 1992/93; fishing was abandoned following poor catches. For management and research purposes the fishery is divided into two parts: northern and southern (divided along 57°20'S). A tagging program was introduced in the Northern Area in 2004/05 and extended to the Southern Area in 2008/09. The total catch of *Dissostichus eleginoides* in the Subarea 48.4 in 2008/09 was 59 t in the Northern Area and 75 tonnes in the Southern Area. The fishery in the Northern Area was closed in 2008/09 when the bycatch limit of *macrourus* spp. was reached. The catch in the Southern Area was for research purposes only.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. The assessment is based on an integrated assessment (CASAL) that uses catch at length, CPUE and tagging data. CASAL model structure and assumptions are detailed in the WG-FSA Report (2009). The assessment in 2009 was used to set catch limits for two years; 2009/10 and 2010/11. A single CASAL assessment model was used for an assessment of *D. eleginoides* in the Northern Area of Subarea 48.3. Long term yield that satisfies the CCAMLR decision rules was 41 tonnes.

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+35\text{years}} \geq 50\% SSB_0$; probability of SSB dropping below 20% of $SSB_0 < 0.1$.

STOCK STATUS: The stock in the Northern Area of Subarea 48.3 is considered to be fully exploited. The status of the stock in the Southern Area is unknown and subject to a research fishing plan.

RECENT MANAGEMENT ADVICE: The catch limit for the Northern Area is 41 tonnes. A catch limit of 75 tonnes for research purposes is in place for the Southern Area. Further tagging of fish during the 2009/10 season will contribute to a new assessment of the fishery.

STECF COMMENTS: STECF has no comments.

23.1.3. Patagonian toothfish (*Dissostichus eleginoides*) in Subareas 58.6 and 58.7 Prince Edward and Marion Islands

FISHERIES: A licensed fishery within the South African EEZ at the Prince Edward Islands started in October 1996. Part of the South African EEZ is outside the CAMLR Convention Area (Area 51) and part falls within Subareas 58.6 and 58.7 and Division 58.4.4. Very large IUU catches, over 7000 tonnes (1996/97) were taken in the late 1990s. The total catch taken in the South African EEZ in 2008/09 season was 4 tonnes, taken by longlines.

SOURCE OF MANAGEMENT ADVICE: The fishery in the waters adjacent to Prince Edward and Marion Islands is managed by the Republic of South Africa. Subarea 58.6 also includes the Crozet Islands to the east of the Prince Edward Islands.

PRECAUTIONARY REFERENCE POINTS: Assessment of appropriate levels of future catch have not been based on the CCAMLR decision rules.

STOCK STATUS: An assessment was reviewed by CCAMLR in 2007. No new assessment was carried out in 2009.

RECENT MANAGEMENT ADVICE: Advice from CCAMLR is that an assessment based on CCAMLR decision rules should be developed. No new information was available on the state of fish stocks in Subareas 58.6 and 58.7 and Division 58.4.4 outside areas of national jurisdiction. This portion of these Subareas and Division is closed to fishing for *D. eleginoides*.

STECF COMMENTS: STECF has no comments.

23.1.4. Patagonian toothfish (*Dissostichus eleginoides*) in Subarea 58.6, Crozet Islands

FISHERIES: A fishery for *Dissostichus eleginoides* operates in the French EEZ around the Crozet Islands in Subarea 58.6. Very large IUU catches, up to nearly 12,000 tonnes (1996/97) were taken in the late 1990s. The total catch of *Dissostichus eleginoides* in 2008/09 in the Subarea 58.6, in the waters adjacent to Crozet Islands was 746t to October 2008. The estimated IUU catch was 0 tonnes in 2008/09, down from 153 tonnes in 2007/08.

SOURCE OF MANAGEMENT ADVICE: The fishery inside the EEZ of the Crozet Islands is managed by France. CCAMLR provides general management advice, for Subarea 58.6. No new information was available to the CCAMLR Scientific Committee in 2008.

PRECAUTIONARY REFERENCE POINTS: Assessment of appropriate levels of future catch have not been based on the CCAMLR decision rules.

STOCK STATUS: No formal stock assessment has been carried out for Subarea 58.6. Tagging has been carried out since 2006.

RECENT MANAGEMENT ADVICE: Advice from CCAMLR is that biological parameters should be estimated and a stock assessment should be developed. Areas of high bycatch should be avoided. No new information was available on the state of fish stocks in Subarea 58.6 outside the area of national jurisdiction. This portion of the Subarea is closed to fishing for *D. eleginoides*.

STECF COMMENTS: STECF has no comments.

23.1.5. Patagonian toothfish (*Dissostichus eleginoides*) in Division 58.5.1, Kerguelen Islands

FISHERIES: A fishery for *Dissostichus eleginoides* operates in the French EEZ around the Kerguelen Islands in Division 58.5.1. Very large IUU catches, of over 7,000 tonnes (1997/98) were taken in the late 1990s and early 2000s. The total catch of *Dissostichus eleginoides* in Division 58.5.1 in 2008/09 was 3 108t (up to 31 August 2008). The estimated IUU catch was 0 tonnes, down from 489tonnes in 2007/08.

SOURCE OF MANAGEMENT ADVICE: The fishery inside the EEZ of the Kerguelen Islands is managed by France. CCAMLR provides general management advice for Division 58.5.1. No new information was available to the CCAMLR Scientific Committee in 2008.

PRECAUTIONARY REFERENCE POINTS: Assessment of appropriate levels of future catch have not been based on the CCAMLR decision rules

STOCK STATUS: No formal stock assessment has been carried out for Division 58.5.1.

RECENT MANAGEMENT ADVICE: Advice from CCAMLR is that biological parameters should be estimated and a stock assessment should be developed. Areas of high bycatch should be avoided. No new information was available on the state of fish stocks in Division 58.5.1 outside the area of national jurisdiction. This portion of the Subarea is closed to fishing for *D. eleginoides*.

STECF COMMENTS: STECF has no comments.

23.1.6. Patagonian toothfish (*Dissostichus eleginoides*) in Subarea 58.5.2, Heard and McDonald Islands

FISHERIES: In Division 58.5.2, the fishery for *Dissostichus eleginoides* was a bottom trawl fishery from the 1996/97 to the 2001/02 season. In recent seasons the fishery has been prosecuted by both trawlers and longliners. Some fishing with pots also occurs. The longline fishery was active from May to September 2009 and the bottom trawl fishery was active throughout the whole season. The total catch of *Dissostichus eleginoides* in Subarea 58.5.2 was 2 177 t for the period from Dec. 2008 until Oct. 2009 (the season close on 30 Nov. 2009).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. There is also a 200 mile EEZ around Heard and McDonald Islands administered by Australia. Assessments are now carried out biennially. The assessment is based on an integrated assessment using CASAL for combined sex, single-area, and a three-season model. CASAL model structure and assumptions are detailed in the WG-FSA Report (2007). The assessment in 2009 was used to set catch limits for two years; 2009/10 and 2010/11.

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+35years} \geq 50\% SSB_0$; probability of SSB dropping below 20% of $SSB_0 < 0.1$

STOCK STATUS: The stock in Subarea 58.5.2 is considered fully exploited.

RECENT MANAGEMENT ADVICE: Long-term annual yield of 2,550 t.

STECF COMMENTS: STECF has no comments.

23.1.7. Toothfish (*Dissostichus* spp.) Exploratory Fishery in Subarea 48.6

FISHERIES: The longline fishery for *Dissostichus* spp. in Subarea 48.6 began as a new fishery in 1996/97. Large IUU catches were taken in the late 1990s. Licensed longline vessels have undertaken exploratory fishing for *Dissostichus* spp. since 2003/04. In 2008/09 two vessels fished in the area south of 60°S with a total catch of 189 tonnes.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

PRECAUTIONARY REFERENCE POINTS: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: The Exploratory Fishery will continue in 2009/10 under the precautionary catch limit for *Dissostichus* spp. Of 200 tonnes north of 60°S and 200 tonnes south of 60°S.

STECF COMMENTS: STECF has no comments.

23.1.8. Toothfish (*Dissostichus* spp.) Exploratory Fishery in Division 58.4.1

FISHERIES: Licensed longline vessels have fished the exploratory fishery for *Dissostichus* spp. in Division 58.4.1 since 2004/05, and the target species is *D. mawsoni*. The reported total catch in 2008/09 up to October 2008 was 222 tonnes of *Dissostichus* spp. The IUU catch in 2008/09 was estimated to be 152 t. pa.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

PRECAUTIONARY REFERENCE POINTS: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: The precautionary catch limit for *Dissostichus* spp. was 210 tonnes in 2008/09. Exploratory fishing will continue in 2009/10 under the same precautionary catch limit.

STECF COMMENTS: STECF has no comments.

23.1.9. Toothfish (*Dissostichus* spp.) Exploratory Fishery in Division 58.4.2

FISHERIES: Licensed longline vessels have fished the exploratory fishery for *Dissostichus* spp. in Division 58.4.2 since 2003/04, and the target species is *D. mawsoni*. In 2008/09, there was a total catch of 66 tonnes of *Dissostichus* spp. Out of a precautionary catch limit of 70 tonnes. Approximately 799 tonnes of *Dissostichus* spp. were taken during IUU fishing in Division 58.4.2 between 2002/03 and 2006/07. There was no evidence of IUU fishing in 2007/08, but it was estimated that 176 tonnes were taken by IUU fishing in 2008/09.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

PRECAUTIONARY REFERENCE POINTS: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: The precautionary catch limit for *Dissostichus* spp. was 70 tonnes in 2008/09. Exploratory fishing will continue in 2009/10 under the same precautionary catch limit.

STECF COMMENTS: STECF has no comments.

23.1.10. Toothfish (*Dissostichus* spp.) Exploratory Fishery in Division 58.4.3a

FISHERIES: Licensed longline vessels have fished the exploratory fishery for *Dissostichus* spp. in Division 58.4.3a since 2004/05, and the target species is *D. eleginoides*. In 2008/09 the total catch was 31 tonnes of *Dissostichus* spp. out of a total precautionary catch limit of 86 tonnes. There was no evidence of IUU fishing in this division in 2008/09. Approximately 98 tonnes of *Dissostichus* spp. were taken during IUU fishing in 2004/05, and there were no reports of sightings or landings related to IUU fishing in 2005/06, 2006/07 and 2007/08.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

PRECAUTIONARY REFERENCE POINTS: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: The catch limit for Division 58.4.3a for the 2008/09 fishing year was 86 tonnes. Exploratory fishing will continue in 2009/10 under the same precautionary catch limit.

STECF COMMENTS: STECF has no comments.

23.1.11. Toothfish (*Dissostichus* spp.) Exploratory Fishery in Division 58.4.3b

FISHERIES: Licensed longline vessels have fished the exploratory fishery for *Dissostichus* spp. in Division 58.4.3b since 2003/04, and the target species is *D. mawsoni*. In 2008/09, the total catch was 104 tonnes of *Dissostichus* spp. out of a total precautionary catch limit of 120 tonnes. The estimated IUU catch of *Dissostichus* spp. in 2008/09 was 610 tonnes. In 2004/05 and 2005/06 the IUU catch exceeded 1 000 tonnes, and in 2006/07 it exceeded 2 000 tonnes. In 2007/08 it was estimated at approximately 246 tonnes.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

PRECAUTIONARY REFERENCE POINTS: The fishery is currently conducted as a CCAMLR Exploratory Fishery. Catch limits are therefore set at a level not substantially above that necessary to obtain the information specified in the Exploratory Fishery's Data Collection Plan.

STOCK STATUS: depleted

RECENT MANAGEMENT ADVICE: In 2008/09, the precautionary catch limit for *Dissostichus* spp. was 120 tonnes. There is no commercial TAC in 2009/10, but there is a scientific research survey planned with a total catch limit of 72 tonnes.

STECF COMMENTS: STECF has no comments.

23.1.12. Toothfish (*Dissostichus* spp.) Exploratory Fisheries in Subareas 88.1 and 88.2 (Ross Sea)

FISHERIES: The Ross Sea fishery saw a steady expansion from 1997/98 to 2000/01, a slight drop in 2001/02, followed by an increase in 2002/03, and an almost three-fold increase in effort in 2003/04. In 2004/05 and 2005/06, overall effort in the Ross Sea dropped, but increased again in 2006/07. In 2006/07, ice conditions resulted in some restrictions on fishing in the southern part of the area. The catch in 2008/09 was 2 434 t in Subarea 88.1 and 484 t in Subarea 88.2. The estimated IUU catch was zero in both Subareas. In Subarea 88.1 the IUU catch was 92 tonnes in 2001/02, 240 tonnes in 2003/04, 23 tonnes in 2004/05 and 187 tonnes in 2007/08. IUU catches in Subarea 88.2 have been much less (15 tonnes in 2005/06).

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. The assessment is based on an integrated assessment (CASAL) that uses catch at age by sex, CPUE and tagging data. CASAL model structure and assumptions are detailed in the WG-FSA Report (2007 and 2008).

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+35years} \geq 50\% SSB_0$; probability of SSB dropping below 20% of $SSB_0 < 0.1$

STOCK STATUS: The stocks in Subareas 88.1 and 88.2 are considered fully exploited. $SSB_{current} > 50\% SSB_0$

RECENT MANAGEMENT ADVICE: The catch limits for the 2009/10 season are 2 850 tonnes and 575 tonnes in Subareas 88.1 and 88.2 respectively.

STECF COMMENTS: STECF has no comments.

23.2. Antarctic Icefish (*Chamsocephalus gunnari*)

23.2.1. Antarctic icefish (*Chamsocephalus gunnari*), Subarea 48.3, South Georgia

FISHERIES: A trawl fishery targeting groundfish, including *Chamsocephalus gunnari* has operated in Subarea 48.3 since the late 1960s. *C. gunnari* has been the dominant species in the catch since 1980/81. Catches peaked at 128,000 tonnes in 1982/83. There was virtually no fishery during the 1990s. Since 1999 the catch has been in the region of 2000 to 4000 tonnes annually. The catch in 2008/09 was 1 837 t. The fishery now utilises exclusively pelagic and semi-pelagic trawls. There has been no evidence of IUU fishing activity in this fishery.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. Advice is based on a single short term (2 year) Generalised Yield Model (GYM) projection of age 2+ using survey-derived estimates of current biomass. A new survey was undertaken in January 2009.

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+2years} \geq 75\% SSB_{current}$

STOCK STATUS: Stock level is highly variable and dependent on recruitment. A responsive management strategy, using a short term (2 year) assessment approach based on the results of groundfish surveys has been used since 2000.

RECENT MANAGEMENT ADVICE: The catch limits for *C. gunnari* are 1 548t in 2009/10 and 949t in 2010/11. The latter catch limit may be revised in November 2010 based on the results of a new survey to be undertaken in January 2010. The annual fishing season is now 1 December to 30 November.

STECF COMMENTS: STECF has no comments.

23.2.2. Antarctic icefish (*Chamsocephalus gunnari*), Division 58.5.2, Heard and McDonald Islands

FISHERIES: A pelagic and semi-pelagic trawl fishery targeting *Chamsocephalus gunnari* has operated in Division 58.5.2 since the late 1970s. Historical catches peaked at 15,200 tonnes in 1976/77. There was virtually no fishery during the early 1990s. Catches fluctuate depending on recruitment. The catch in 2007/08 was 199 t. There has been no evidence of IUU activity in this fishery.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. Advice was based on a single short term (2 year) Generalised Yield Model (GYM) projection of age 2+ using survey-derived estimates of current biomass.

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+2years} \geq 75\% SSB_{current}$

STOCK STATUS: Stock level is highly variable and dependent on recruitment. A responsive management strategy, using a short term (2 year) assessment approach based on the results of groundfish surveys has been used since 2000. There is evidence of cyclic behaviour in adult population size, with a peak in the fishery every three years.

RECENT MANAGEMENT ADVICE: The aggregate two year catch will be taken in one year, followed by a one year closure. The catch limit for *C. gunnari* is therefore 1 658 in 2009/10 and 0t in 2010/11.

STECF COMMENTS: STECF has no comments.

23.3. Lantern fish (*Electrona carlsbergi*), Subarea 48.3, South Georgia

FISHERIES: The last year in which there were catches from *E. Carlsbergi* fishery was 1991/92 (51,865 t). There was no reported catch of lantern fish in this area in 2008/09.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. The fishery has not been assessed since 1994.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: The state of the stock was last assessed in 1994. A precautionary catch limit has been set at 109 000 t. Since the average life span of this species is about five years, the 1994 assessment is no longer applicable. CCAMLR closed the fishery on this species in 2003.

RECENT MANAGEMENT ADVICE: Due to the lack of new information on the current status of the stock, CCAMLR has agreed that the fishery will remain closed until a new survey on this species is conducted and results have been evaluated by the Scientific Committee.

STECF COMMENTS: STECF has no comments.

23.4. Krill (*Euphausia superba*)

The krill fishery operated only in Area 48 during the 2007/08 season. Six vessels from five member nations fished. The total catch was 125 063 t. Nine countries have submitted notifications for 18 vessels in the 2008/09 season. A notification for an exploratory krill fishery in Subarea 48.6 was also received.

23.4.1. Krill (*Euphausia superba*) Area 48

FISHERIES: The total catch of krill in the 2008/09 season, was 123 948 t. The catch was taken from Subareas 48.1 and 48.1 Less than 1 tonne was taken from Subarea 48.3 (South Georgia), which has previously been an important area for the krill fishery, particularly in winter when areas further south are less accessible due to ice cover. The winter catch in Subarea 48.2 was significantly higher than average, hence despite the lack of catch from South Georgia, the overall total catch was very similar to 2007/08.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR. Advice on the overall catch limit is based on a long term (10 year) Generalised Yield Model projection using survey-derived estimates of current biomass and recruitment variability. An integrated assessment method has been proposed as alternative assessment methods. CCAMLR has also recognised the need address the spatial overlap between krill dependent land-based predators and the commercial krill fishery. Since the demise of the distant water fleet of the former Soviet Union, fishing for krill has been more concentrated in coastal areas where krill concentrations are more easily located.

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+35years} \geq 75\% SSB_0$; probability of SSB dropping below 20% of $SSB_0 < 0.1$.

STOCK STATUS: Revised $B_0 = 37.29$ million tonnes.

RECENT MANAGEMENT ADVICE: Under conservation measure 51-01 (2007) the total catch of krill in Area 48 is limited to 3.47 million t with a trigger level of 620,000t. The trigger level cannot be exceeded until the Commission has defined an allocation of this total catch limit between small scale management units, as defined by the Scientific Committee. At the 2009 meeting, the Commission took a step in this direction by agreeing an interim distribution of the catch between Subareas 48.1, 48.2, 48.3 and 48.4, based on percentages of the trigger level; 25%, 45%, 45% and 15% respectively. The percentages include some overlap to accommodate variability in the location of the fishery between subareas.

STECF COMMENTS: STECF has no comments.

23.4.2. Krill (*Euphausia superba*), Subarea 48.6

FISHERIES: There was no catch of krill in this area in. 2008/09. An exploratory fishery was notified by one CCAMLR Member for the 2009/10 season.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+35years} \geq 75\% SSB_0$; probability of SSB dropping below 20% of $SSB_0 < 0.1$.

STOCK STATUS: Unknown

RECENT MANAGEMENT ADVICE: The catch limit proposed under Conservation Measure 51-05 (2009) for the Exploratory Fishery is 15,000t of which no more than 11 250t shall be taken from within 60n miles of known breeding colonies of land-based dependent predators.

STECF COMMENTS: STECF has no comments.

23.4.3. Krill (*Euphausia superba*), Division 58.4.1

FISHERIES: There was no catch of krill in this area in. 2008/09.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+35\text{years}} \geq 75\% SSB_0$; probability of SSB dropping below 20% of $SSB_0 < 0.1$.

STOCK STATUS: A survey in the region (1996) provided a B_0 estimation of 4.83 million t (will be revised using new protocols).

RECENT MANAGEMENT ADVICE: The catch limit proposed under Conservation Measure 51-02 (2006) is 440,000 t.

STECF COMMENTS: STECF has no comments.

23.4.4. Krill (*Euphausia superba*), Division 58.4.2

FISHERIES: There was no catch of krill in this area in 2008/09.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

PRECAUTIONARY REFERENCE POINTS: $SSB_{t+35\text{years}} \geq 75\% SSB_0$; probability of SSB dropping below 20% of $SSB_0 < 0.1$.

STOCK STATUS: Revised $B_0=12.46$ million tonnes.

RECENT MANAGEMENT ADVICE: Under conservation measure 51-03 (2007) the total catch of krill is limited to 1.488 million t with a trigger level of 260,000 t west 55°E and 192,000 t east 55°E.

STECF COMMENTS: STECF has no comments.

23.5. Antarctic squid (*Martialia hyadesi*), Subarea 48.3, South Georgia

FISHERIES: There has been no fishery for squid (*Martialia hyadesi*) since 2002/03, and no new request has been submitted to CCAMLR to continue exploratory fishing for this species in 2009/10.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is CCAMLR.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Unknown; unexploited.

RECENT MANAGEMENT ADVICE: The fishery is now closed until such time as a new notification for an exploratory fishery is received by CCAMLR.

STECF COMMENTS: STECF has no comments.

23.6. Crabs (*Paralomis spinosissima* and *Paralomis formosa*), Subareas 48.3 (South Georgia), 48.2 (South Orkneys) and 48.4 (South Sandwich Islands),

FISHERIES: Stone crabs (*Paralomis* spp.) were exploited briefly during the 1990s in Subarea 48.3. There has been no fishery since 2002/03. Russia has notified its intention to conduct a fishery for crabs in Subarea 48.3 during the 2009/10 season, including exploratory fishing in Subareas 48.2 and 48.4.

SOURCE OF MANAGEMENT ADVICE: The main management advisory body is the CCAMLR.

PRECAUTIONARY REFERENCE POINTS: No precautionary reference points have been proposed for this stock.

STOCK STATUS: Unknown; unexploited.

RECENT MANAGEMENT ADVICE: The catch limit in Subarea 48.3 is 1,600 tonnes. Proposed limits for the exploratory fishery are 250 tonnes for Subarea 48.2 and 10 tonnes for Subarea 48.4. An experimental harvest regime shall apply throughout the fishery.

STECF COMMENTS: STECF has no comments.

24. Proposed designation of a Marine Protected Area in CCAMLR sub-area 48.2

Background

The Commission aims to propose designation of Marine Protected Area in CCAMLR sub-area 48.2, more specifically, to the south of the South Orkney Islands, for the consideration of CCAMLR Plenary.

The region surrounding the South Orkney Islands has been previously identified by CCAMLR as one of 11 priority areas in which work to establish spatial protection should be focused.

At the last Working Group on Ecosystem Monitoring and Management (WG EMM), the UK presented a paper "Towards a System of Marine Spatial Protection for the South Orkney Islands". The WG EMM agreed that the data used in this paper have been used appropriately and that the analyses are likely to yield a conservative and unbiased estimate of target areas for MPAs in the South Orkney Islands region. WG EMM therefore recommended that the Scientific Committee consider these results and any extension to the analysis in the paper to identify MPAs in Subarea 48.2 for inclusion of representative system of MPAs. The preliminary report of the WG EMM is attached.

The Scientific Committee meeting will be held just before the CCAMLR Plenary and we expect it to elaborate on the findings of this paper. CCAMLR is a unique organisation due to its ecosystem approach and it is managing a very fragile ecosystem. It has the competence to declare closed areas, closed seasons and can also impose prohibition of certain fishing activities in certain areas. Most recently, the performance review Panel called on CCAMLR to take a more proactive role with respect to the designation of MPAs.

Request to STECF

STECF is requested to advise on this proposed management option and its possible impacts on stocks distributed within CCAMLR Subarea 48.2.

Scientific papers, the report of last and the previous years' meetings of the CCAMLR Scientific Committee can be found on this publicly available website: http://www.ccamlr.org/pu/E/e_pubs/sr/drt.htm

STECF Observations

STECF reviewed the paper entitled "Preliminary proposal for marine spatial protection around the South Orkney Islands" (Annex III). The paper describes the application of conservation planning methodology (Margules & Pressey, 2000) together with Marxan reserve selection software (Game & Grantham, 2008) to identify a number of candidate pelagic areas of conservation importance across the South Orkney Islands region based on conservation objectives defined for the region.

Four key areas of conservation importance were identified, each of which meet as far as possible, all of the defined conservation objectives for the minimum cost in terms of area or other costs such as existing fishing use.

The preliminarily proposed marine protected area (MPA) was selected by applying three design rules, based on those used by Lombard et al. (2007) in the development of a MPA around the Prince Edward Islands, to the Marxan analysis output. The design rules were as follows:

1. Minimize the area required to meet the objectives

2. Avoid overlap of proposed protected areas with current fishing activities where choices exist, but do not compromise biodiversity targets.
3. Use practical boundaries, e.g. by using straight lines, and exact degrees and minutes where possible.

STECF notes that the data and analyses used in the selection of the proposed preliminary MPA appear appropriate to identify candidate areas for MPAs in the South Orkney Islands region.

STECF notes that although four main areas were identified by the Marxan analysis as having high conservation value, the preliminarily proposed MPA (Figure 13.1) was prioritized as a candidate area for protection, because of its predictable importance for penguin foraging.

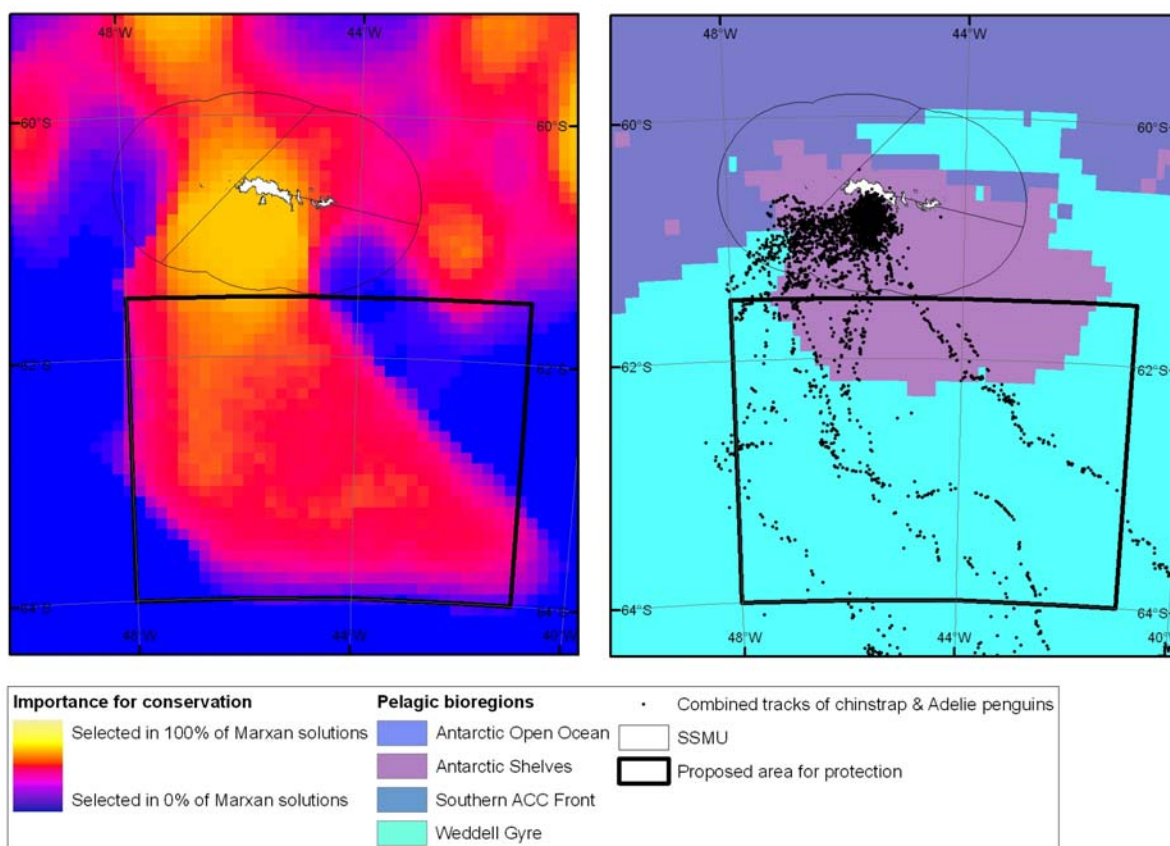


Figure 13.1. Left panel: Preliminary area proposed for spatial protection (thick black line) in the southeastern sector of Subarea 48.2, with the Marxan output shown in the background; Right panel: pelagic bioregions and combined tracks of chinstrap and Adelie penguins occurring within the proposed area for protection and the existing SSMUs (thin black line).

STECF also notes that proposed preliminary area has minimal overlap with current and proposed fishing activities within Subarea 48.2, and includes only one fine-scale rectangle in which krill fishing has taken place in the past (Figure 13.2). It also includes two of the fine-scale rectangles identified as part of the operational area for the experimental harvest of crabs. All of Subarea 48.2 is currently closed to fin-fishing (CM 32-03, 1998), so the proposed MPA would not affect any other fisheries.

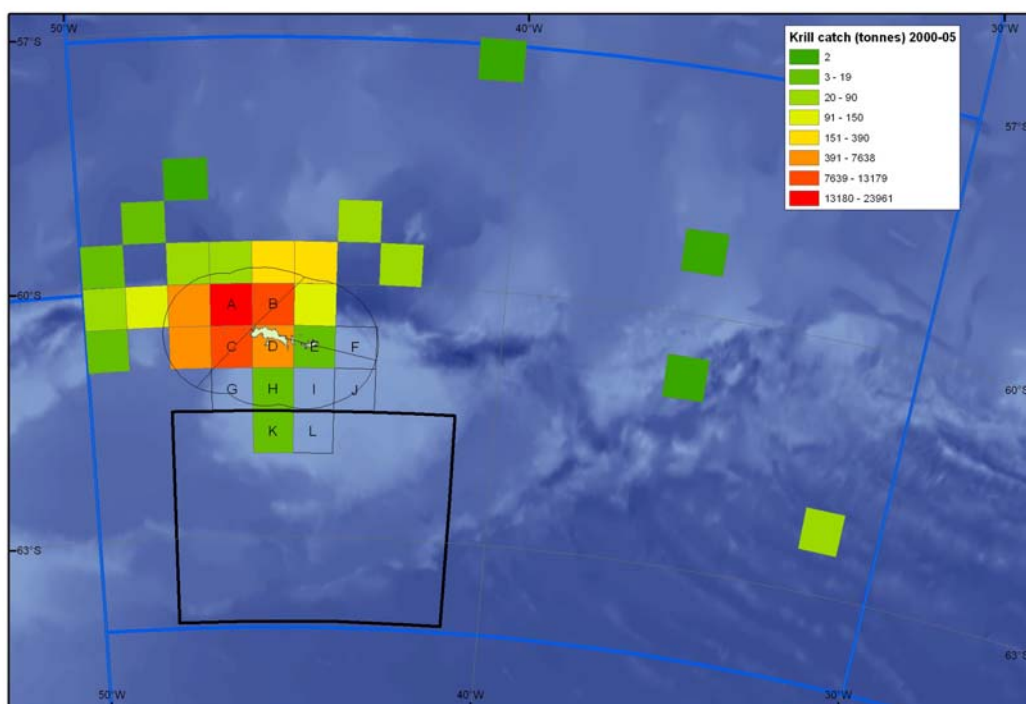


Figure 13.2. Location and extent of the krill fishery in Subarea 48.2 from 2000 to 2005 (data from CCAMLR Statistical Bulletin, 2006), showing total catches within each fine-scale rectangle during this period. Fine-scale rectangles with letters A to L show the operational area for phase I of the experimental harvest regime for the crab fishery (WG-FSA Report 2008, Figure 2). The existing SSMUs (thin black line) and proposed candidate area for protection (black box) is also shown.

STECF Conclusion

Given that the methodology to identify candidate MPAs in CCAMLR Subarea 48.2 and that the design rules used to select the preliminary MPA seem appropriate, STECF agrees that the area identified is a sensible candidate for a MPA in CCAMLR Subarea 48.2. Noting that finfish fishing is prohibited in Subarea 48.2 and that the overlap between the proposed MPA and existing and proposed fisheries is minimal STECF concludes that the impacts on fishing activities and fish stocks in the area are likely to be negligible.

25. List of Acronyms

ACOM	The Advisory Committee of ICES
ACFM	The Advisory Committee on Fishery Management
ASPM	Age structured population model
BRP	Biological Reference Points
CCAMLR	Committee for the Conservation of Antarctic Marine Living resources
CCSBT	Commission for the Conservation of Southern Bluefin Tuna
CECAF	Committee for Eastern Central Atlantic Fisheries
CPFD	Catch per fishing day
CPS	Commission du Pacifique Sud
CPUE	Catch per unit effort
CTMFM	Comisión Técnica Mixta del Frente Marítimo
DEPM	Daily egg production method
DFO	Department of Fisheries and Oceans
EIAA	Economic Interpretation of the ACFM Advice
EIFAC	European Inland Fishery Advisory Committee
EEZ	Exclusive economic zone

EPO	Eastern Pacific Ocean
F	Fishing mortality
FAO	Fisheries and Agriculture Organization
FAD	Fishing Attracting Device
FARWEST	Fisheries Assessment Research in Western Mediterranean
FIGIS	Fisheries Geographical Information System
FICZ	Falkland Island Inner Conservation Zone
FIFD	Falkland Islands Fisheries Department
FOCZ	Falkland Island Outer Conservation Zone
FRCC	Fisheries Resources Conservation Committee
FU	Functional Units
GFCM	General Fisheries Commission for the Mediterranean
GRUND	GRUpo Nazionale Demersali (Italy)
IATTC	Inter American Tropical Tuna Commission
IBSFC	International Baltic Sea Fisheries Commission
ICA	Integrated catch at age analysis
ICCAT	International Commission for Conservation of Atlantic Tuna
ICES	International Council for the Exploration of the Sea
ICS	International Scientific Committee for Tuna and Tuna-like species in the North Pacific Ocean
IFREMER	Institut Français de Recherche pour l'Exploitation de la Mer
IEO	Instituto Español de Oceanografía
INIDEP	Instituto Nacional de Investigación y Desarrollo Pesquero
IOTC	Indian Ocean Tuna Commission
IUU	Illegal, Unregulated and Unreported
LCA	Length-based cohort analysis
LLUCET	Project to study the recruitment and juveniles of hake
LPUE	Landings per unit effort
MBAL	Minimum biologically acceptable level
MEDITS	International Bottom Trawl Surveys in the Mediterranean
MEDLAND	Mediterranean Landings
MSY	Maximum sustainable yield
MSVPA	Multi Species VPA
NAFO	Northwest Atlantic Fisheries Organisation
NEA	North East Atlantic
NEI	Not Elsewhere Included
NEMED	<i>Nephrops</i> in Mediterranean Sea
NRIFS	National Research Institute for Far Seas Fisheries - Japan
PA	Precautionary Approach
PICTs	Pacific Islands Countries and Territories
PO	Pacific Ocean
RRAG	Renewable Resources Assessment Group
SAC	Scientific Advisory Committee (GFCM)
SAFC	South Atlantic Fisheries Commission
SAGP&A	Secretaría de Agricultura, Ganadería, Pesca y Alimentos (Argentina)
SCRS	ICCAT Standing Committee on Research and Statistics
SCSA	Sub-Committee on Stock Assessment (GFCM)
SCTB	Standing Committee on Tuna and Billfish (western and central Pacific Ocean)
SGRST STECF	Subgroup on Resource Status
SPC	Southern Pacific Commission
SSB	Spawning stock biomass
SSB/R	Spawning stock biomass per recruit
STECF	Scientific, Technical and Economic Committee for Fisheries
TAC	Total Allowable Catch
WCPO	Western Central Pacific Organisation
WCPFC	Western Central Pacific Fishery Organisation
WECAF	Committee for Western Central Atlantic Fisheries
WGEF	Working Group on Elasmobranchs Fishes

WIO	Western Indian Ocean
WP	IOTC Working Parties
WPB	IOTC Working Parties on Billfish
WPTT	IOTC Working Parties on Tropical Tunas
WPO	Western Pacific Ocean
XSA	Extended survivors analysis
Y/R	Yield per recruit

26. Reference

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27. Annex I Contact details of Participants

SGECA/RST 09-01 Copenhagen meeting June 2009

First Name	Last Name	Address	Telephone	Email
STECF members				
Eskild	Kirkegaard,	Danish Technical University, Jægersborgvej 64-66. 2800 Lyngby, Denmark	+ 45 33 96 33 42	ek@aqua.dtu.dk
External experts				
Leskelä, Ari		Finnish Game and Fisheries Research Institute Finland Yliopistokatu, 6, Joensuu, 80100, Finland	+358 205751404	ari.leskela@rktl.fi
Kornilovs, Georgs		Latvian Fish resources Agency, Daugavgrivas, 8 Riga, LV-1048 Latvia	+371 676760027	georgs.kornilovs@lzra.gov.lv
Horbowy, Jan		Sea Fisheries Institute, ul Kollataja 1 Gdynia 81-332, Poland	+48 587356267	horbowy@mir.gdynia.pl
JRC experts				
Raid, Tiit		Joint Research Centre JRC, IPSC, via E. Fermi 1, Ispra (VA), I- 21027, Italy	+39 0332 783597	tiit.raid@jrc.it

SGECA/RST 09-02 Brest meeting, June-July 2009

First Name	Last Name	Address	Telephone	Email
STECF Members				
John	Casey	CEFAS, Pakefield Road, Lowestoft, NR33 0HT, UK.	441502524251	john.casey@cefas.co.uk
Willy	Vanhee	ILVO, Hospitaalstraat, 8400, Oostende, Belgium.	+32(059)433083	wvanhee@pandora.be
Christoph	Stransky	Johann Heinrich von Thünen Institute [vTI] Federal Research Institute for Rural Areas, Forestry and Fisheries, Institute of Sea Fisheries, Palmaille 9, D-22767 Hamburg, Germany	Tel. +49 40 38905-228 Fax: +49 40 38905-263	christoph.stransky@vti.bund.de

First Name	Last Name	Address	Telephone	Email
Invited Experts				
Michel	Bertignac	IFREMER, Brest, France.	(33) 2 98 22 45 25	michel.bertignac@ifremer.fr
Georgi	Daskalov	CEFAS, Pakefield Road, Lowestoft, NR33 0HT, UK.	+44 (0) 1502 524584	georgi.daskalov@cefass.co.uk
Steven	Holmes	FRS, Victoria Road, Torry, Aberdeen, UK.	+44(0)1224 295507	s.holmes@marlab.ac.uk
Michael	Keatinge	BIM, State Agency, Crofton Road, Ireland.	35312144230	keatinge@bim.ie
Valodia	Maximov	NIMRD Grigore Antipa Constanta, Mamaia 300, 900581 Constanta, Romania	40/241543288	maxi@alpha.rmri.ro
Sten	Munch-Petersen	DTU-Aqua, Charlottenlund Castle, DK-2920, Denmark.	+45 21686627	smp@aqua.dtu.dk
Brendan	O'Hea	RinvilleOranmore, Galway, Ireland	+35391 387304	brendan.ohea@marine.ie
Marina	Panayotova	Institute of Oceanology – BAS, Parvi may 40, 9000 Varna, Bulgaria	Fax: +359 52 370 483	mpanayotova@io-bas.bg
Gheorge	Radu	NIMRD Grigore Antipa Constanta, Mamaia 300, 900581 Constanta, Romania	40/241543288	maxi@alpha.rmri.ro
Violin	Raykov	IFR, Tzar Assen 30, 9000 Varna, Bulgaria	35952624382	vio_raykov@abv.bg
Vladyslav	Shlyakhov	YugNIRO 2, Sverdlov Str, 98300 Kerch, Ukraine	38 065616 21012	fish@kerch.com.ua
Mustafa	Zengin	Central Fisheries Research Institute, Yomra, 61100 Trabzon, Turkey	9+04623411053	mzengin@hotmail.com
JRC expert & STECF secretariat				
Tiit	Raid	European Commission, Joint Research Centre, Maritime Affairs, I-21020 Ispra (VA), Italy.	0039 0332786581	Tiit.raid@jrc.it Stecf-secretariat@jrc.it

SGECA/RST 09-03 Vigo meeting, October 2009

STECF members				
Last name	First name	Address	Telephone	Email
Casey	John	CEFAS, Pakefield Road, Lowestoft, NR33 0HT, UK	+441502524251	john.casey@cefas.co.uk
Di Natale	Antonio	AQUASTUDIO Research Institute Via Trapani 98121 Messina Italy	+39 090 346408	adinatale@acquariodigenova.it
Vanhee	Willy	ILVO, Hospitaalstraat 8400 Oostende Belgium	+32(059)433083	wvanhee@pandora.be
Invited experts				
Last name	First name	Address	Telephone	Email
Fabi	Gianna	CNR-ISMAR Largo Fiera della Pesca 2 60125 Ancona Italy	+39 071 2078825	g.fabi@ismar.cnr.it
Gil de Sola	Luis	IEO Muelle Pesquero s/n 29640 Fuengirola Spain	+34 952472261	gildesola@ma.ieo.es
Johnston	Graham	Marine Institute Rinville Oranmore Galway Ireland	+35391387200	graham.johnston@marine.ie
Katsanevakis	Stelios	HCMR, Athens-Sounio, PO Box 712, Greece	+2109856701	skatsan@ath.hcmr.gr
Keatinge	Michael	State Agency Crofton Road Dublin Ireland	+35312144230	keatinge@bim.ie
Kupschus	Sven	Cefas Pakefield Road NR330HT Lowestoft UK	+441502524454	s.kupschus@cefas.co.uk
Mahé	Jean-Claude	IFREMER, 8 rue François Toullec 56100 Lorient France	+33 297873818	jean.claude.mahe@ifremer.fr
Main	Charlotte	Marine Scotland Science, 375 Victoria Road AB11 9DB Aberdeen UK	+441224876544	c.main@marlab.ac.uk
Petrakis	George	Hellenic Centre for Marine Research, Metaxa 16674 Glyfada Greece	+302108947486	gpetr@ath.hcmr.gr
Portela	Julio	Instituto Español de Oceanografía, Subido Radiofaro, Vigo, Spain	+34986492111	julio.portela@vi.ieo.es

JRC secretariat and expert				
Last name	First name	Address	Telephone	Email
Druon	Jean-Noël	JRC-IPSC Via Fermi 1 21027 Ispra (VA) Italy	+390332786468	jean-noel.druon@jrc.ec.europa.eu

Experts contributing by correspondence:

Last name	First name	Institution Address	Telephone	E-mail
Santamaría	M ^a Teresa	Centro Oceanográfico de Canarias. Avenida 3 de Mayo nº 73. 38005 Santa Cruz de Tenerife. Islas Canarias, España	(+34) 922549400	teresa.garcia@ca.iao.es teresa.garcia@oceanografia.es
García-Isarch	Eva	Centro Oceanográfico de Cádiz. Puerto Pesquero, Muelle de Levante, s/n. 11006 Cádiz, España	(+34) 956294189	eva.garcia@cd.iao.es
Fernández	Lourdes	Centro Oceanográfico de Málaga. Puerto Pesquero s/n. 29640 Fuengirola (Málaga), España	(+34) 952476955	lourdes.fernandez@ma.iao.es
Arkhipkin	Alexander	Falkland Islands Government, Fisheries Department, Argentina	+500 27260	aarkhipkin@fisheries.gov.fk
López-Abellán	Luis J.	Centro Oceanográfico de Canarias. Avenida 3 de Mayo nº 73. 38005 Santa Cruz de Tenerife. Islas Canarias, España	(+34) 922549400	luis.lopez@ca.iao.es luis.lopez@oceanografia.es

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Abstract

This report represents the STECF review of advice for stocks of interest to the European Community in all of the world's oceans. It constitutes a consolidated version of three reports from STECF-SGECA/RST Stock Review meetings convened in 2009, SGECA/RST-09-01, SGECA/RST 09-02 and SGECA/RST 09-03. The reports from the three meetings were published as Parts 1 and 2 of the STECF review of advice for 2010, and as the review of advice for stocks in the Baltic. However, since the publication of the three separate reports, some fisheries advisory bodies have published additional information and advice and this has been taken into account in the present report. This report therefore supersedes any advice on stocks of Community interest previously given by the STECF for 2010.

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